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THE MEDICAL JOURNAL OF AUSTRALIA.

VOL. I.—6TH YEAR. SYDNEY: SATURDAY, MAY 3, 1919. No. 18.

TROPICAL AUSTRALIA AND ITS SETTLEMENT.

By A. Breinl and W. J. Young.

(From the Australian Institute of Tropical Medicine, Townsville.)

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Introduction.

Tropical Australia and its settlement by a British race has formed the theme of numerous public utterances and of a good deal of writing in both the scientific and lay press. Sometimes these utterances have been dictated by ultilitarian reasons alone, sometimes they have only formed part of a general political propaganda; many have been influenced by personal prejudice and were put forth by writers whose experience of life in Northern Australia did not qualify them to express an opinion on this subject.

On many occasions, when the ultimate fate of Northern Australia has formed the subject of discussion at various scientific meetings, the speakers have applied indiscriminately to Northern Australia the outcome of experiences gained by themselves or by others in various parts of the tropics, without realizing that Northern Australia occupies a different position, on account of the absence of a settled native population and its peculiar climatic conditions.

The following pages are the outcome of several years' investigation in and consideration of conditions obtaining in Northern Australia and their influence upon a settled white race. A résumé is included of previous investigations by other workers into the practicability of a white settlement of other parts of the tropics and the influence of tropical life upon a population of European descent. An attempt is made to sift facts and to review the results of previous investigations, published in numerous scattered journals, most of which, with the exception of the experiments carried out in the Philippine Islands, have not only been done in a haphazard way, but sweeping conclusions have been based upon a few unsystematic observations.

The problem of the settlement of tropical Australia by a white race is a very difficult and complicated one, since two factors enter into the question. In the first place, climatic conditions and their effect upon the white man are of paramount importance, since racial degeneration, brought about by climatic conditions alone, would decide the problem. At the same time the economic side of the question plays an important part and cannot be neglected, and a discussion on this aspect has been included.

Opportunity is taken here to thank Mr. H. A. Hunt, the Commonwealth Meteorologist, for putting at our disposal the climatic data, and also Mr. G. H. Knibbs, C.M.G., the Commonwealth Statistician, for help and suggestion in connexion with the statistical data.

The Climate of Northern Australia.

The Australian living in the southern parts of his continent generally possesses only a very uncertain knowledge of the climate of the northern parts. He assumes that the whole of the north above the tropic has a uniformly hot climate, that heat and mugginess persist and that a feeling of personal comfort is only a rare sensation. This popular conception arises from the general idea of "tropics"; most people in their early youth associate with "tropics" a land of impenetrable jungle, heat, swamp and fever, an impression gained by reading books of adventure and travel.

The scientific study of climates within the tropics shows, however, that there exists a great diversity of climatic conditions, regulated by a number of factors, such as the nearness to the ocean, elevation above sea level, proximity to high mountain ranges which control rainfall, prevailing wind and, above all, the amount and monthly distribution of the rainfall.

To describe climate from the point of view of its effects upon a human race is impossible with our present means. It is only to a certain extent that climate, as we feel it, finds a graphic expression in those meteorological observations usually recorded, which measure heat and humidity only, namely, the readings of the dry and wet bulb thermometers. From these readings is further calculated the relative humidity, that is, the extent to which the atmosphere is laden with moisture. The degree of personal comfort or discomfort experienced is indicated to some extent by these readings, but it is certain that many other factors play a large part in determining individual sensations.

Numerous attempts, summarized as far as 1908 by Hann, have been made to construct a "discomfort scale," but no satisfactory solution has yet been attained. Conspicuous amongst these is that of Cleveland Abbé, who suggested a "curve of comfort," based upon three factors, namely, air temperature, relative humidity and wind velocity. By plotting temperatures against humidities for a certain velocity of wind and estimating personal comfort or discomfort under these conditions, he obtained charts which correlated his personal sensation with the above factors.

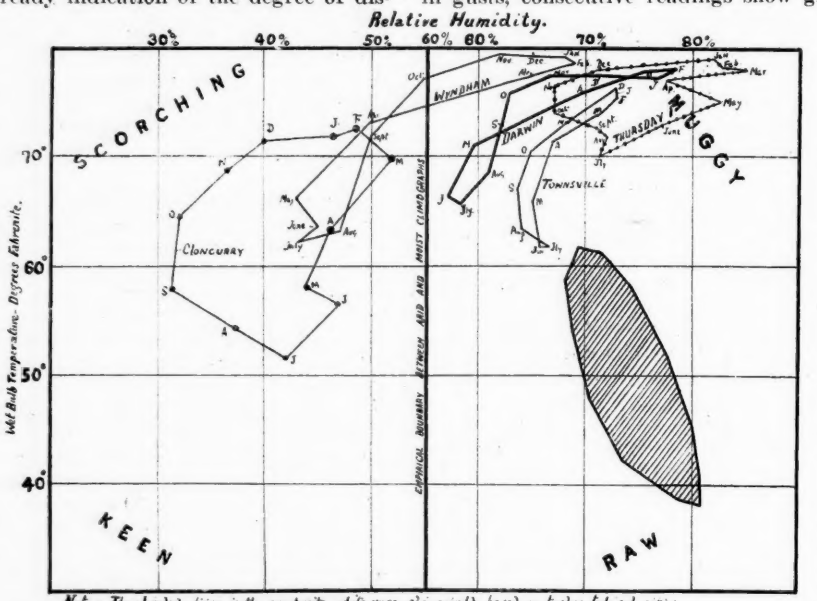
Wet bulb temperatures alone were first used as a guide to comfort by Harrington, who termed them "sensible temperatures" and mapped out wet bulb isotherms for the United States of America for the

month of July. The importance of wet bulb readings has been further emphasized by Haldane (1905), who demonstrated experimentally that the regulation of body temperature above a certain wet bulb reading became disorganized and human energy was paralysed. He therefore suggested wet bulb temperatures as a standard by which to regulate conditions in factories, mines and workshops.

Griffith Taylor (1916) has suggested a tentative scale of discomfort, applying only to warmer regions, where humidity and temperature are the chief factors, a scale depending on wet bulb readings. He divided "climate" into the following grades:—

8.3°-12.7° C. (45°-55° F.) wet bulb—Most comfortable.
12.7°-15.5° C. (55°-60° F.) wet bulb—Very rarely uncomfortable.
15.5°-18.3° C. (60°-65° F.) wet bulb—Sometimes uncomfortable.
18.3°-21.1° C. (65°-70° F.) wet bulb—Often uncomfortable.
21.1°-23.7° C. (70°-75° F.) wet bulb—Usually uncomfortable.
Over 23.7° C. (over 75° F.) wet bulb—Continuously uncomfortable.

A rough-and-ready indication of the degree of discomfort, used by Osborne (1916), is the amount of clothing required to enable him to lie in an open-mesh-work hammock. His experiences have led him to set a wet bulb of about 22.75° C. (73° F.) as an empirical standard above which truly tropical conditions arise.



Note.—The shaded figure is the composite white race climograph based on twelve typical cities

FIGURE I.

Many authors, however, contend that wet bulb readings alone are not an unerring indication of the subjective sensation caused by climate. L. Hill (1914, 1916), for example, pointed out: "It is no use to trust to the ordinary thermometer, either wet or dry, because it does not show heat loss. It only shows its own temperature, the average temperature of the furniture, surroundings and walls; it does not show the heat loss of the body. Whilst the thermometer is a static instrument indicating average temperature, the human body is a dynamic structure, continually producing and losing heat, while its temperature remains sensibly constant." He deprecated the use of relative humidity as a criterion of comfort, and suggested the katathermometer, a new apparatus, which would register the rate of heat loss and thus indicate more closely the effect of temperature and atmospheric conditions upon the human body. This instrument consists of two thermometers, each having a large bulb filled with alcohol; one of these is kept dry—the dry bulb katathermometer; the other is kept moist by means of a wet cotton glove—the wet bulb katathermometer. Both are heated to 43.3° C. (110° F.) and the time which each takes to cool from 43.3° to 32.2° C. (110° to 90° F.) is noted. The dry bulb katathermometer thus measures the rate of cooling by convection and radiation, the wet bulb katathermometer that by convection, radiation and evaporation and thus measures not the actual air temperature but the rate of cooling of a moist body, due to the effects of the atmospheric condition at an actual temperature approximating to that of the human body. Practical experience has shown, however, that the wet bulb katathermometer is too sensitive to air currents. Osborne (1916) has pointed out that a series of readings taken in rapid succession, yields fairly uniform results only in still air indoors, or outdoors if a steady breeze be blowing. On the other hand, when the wind comes in gusts, consecutive readings show great variations. Observations in Townsville with the katathermometers have confirmed Osborne's experience and have proved that calm weather, as far as the katathermometer readings are concerned, is a rare exception and days classed as still to personal sensation may not be so to the katathermometer.

Griffith Taylor (1916) attempted to overcome the difficulty of judging a climate in a novel manner, by introducing a graphic representation, termed a climograph, and plotting the monthly means of relative humidity against monthly means of wet bulb readings. He compiled as a standard a composite climograph, by using average figures for towns situated in regions where human energy is at its best, selecting for this purpose five towns in the southern and seven towns in the northern hemisphere, where the average monthly wet bulb readings ranged between 2.7° and 16.6° C. (37° and 62° F.). This climograph, according to Taylor, represents ideal conditions for the white race, and he terms it the "white race climograph." On the same principle he constructed a number of climographs for different parts

of the world and differentiated in this way four extreme climatic types—hot and damp, hot and dry, cold and damp and cold and dry—and compared the climographs of Australian towns with these types (see Fig. I.). The shape of the climograph also indicates the seasonal distribution of rainfall.

It is an ingenuous and striking method of comparing in a general way the climate of any given locality with a type, but does not convey any further information than the mean readings of dry and wet bulb thermometers, and it is significant that Taylor himself, when discussing the question of discomfort in relation to climate, uses the wet bulb readings as guide.

Bruce (1916) has proposed the use of dew point as an indicator of the effects of atmospheric conditions upon the human body, and comes to the conclusion that the dew point most desirable for human activity is 16.6° (62° F.), that is to say, that air saturated with moisture at 16.6° (62° F.) is neither muggy nor chilly. If the dew point, however, rises over 21.1° C. (70° F.) the conditions become exceedingly trying.

This principle has been applied to the average temperatures recorded in Townsville and the results have indicated that the dew point at 9 p.m., is, as a rule, higher than at 9 a.m. or 3 p.m., although the conditions in the evenings are, on the whole, undoubtedly less trying than those prevalent during the day. Furthermore, this principles does not take into account the effects of other conditions, such as wind and sunshine.

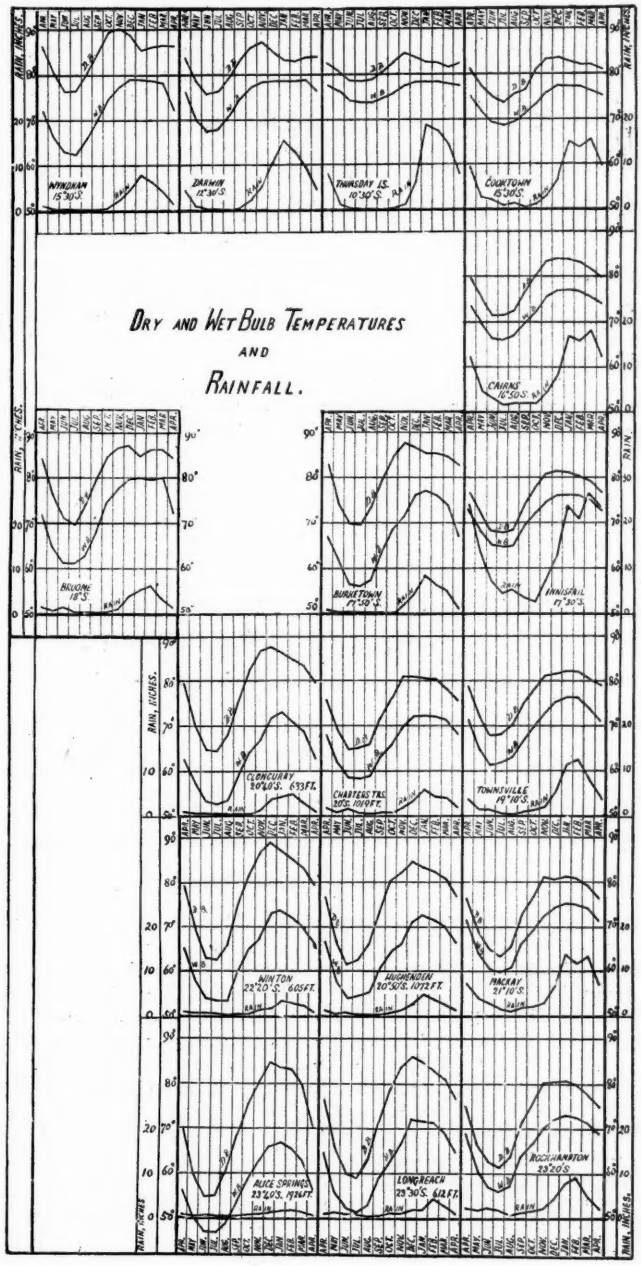


FIGURE II.

It would appear, therefore, that neither humidity nor dew point give any more information in regard to personal comfort than the readings of dry and wet bulb thermometers.

Hunt, at Osborne's suggestion, constructed wet bulb isotherms for Australia—the only part of the world for which such complete isotherms have been published — attempting thus to represent graphically climatic conditions as far as personal comfort is concerned. As pointed out previously, wet bulb temperatures alone in this respect are only of limited value, since experience has shown that, although high wet bulb temperature, approaching the limit of safety, may be a guide to discomfort, yet lower ones, without the accompanying dry bulb readings, are indefinite. From our personal experience, wet bulb readings above a certain limit invariably denote discomfort, yet the dry bulb temperature even then modifies the degree of discomfort felt. For example, a wet bulb reading of 26.6° C. (80° F.) is never pleasant, but the degree of discomfort becomes exaggerated in direct proportion to the dry bulb reading. For these reasons it has been thought advantageous to make use simultaneously of the mean dry and wet bulb readings for the comparison of the various parts of Northern Australia. In the accompanying graphs (Fig. II.) are plated the average monthly dry and wet bulb temperatures, taken at 9 a.m. over a period of five years, and the points are connected by lines for distinctness only, the 10° C. (50° F.) line being indicated in order to make a comparison easy. Since the temperatures are so dependent on the rainfall,

average rainfalls obtained from Hunt's publications have been plotted in these charts. The relative positions of the graphs of the various towns are arranged diagrammatically as near as possible in accordance with their geographical position (compare map, Fig. III.). Thus the coastal towns are represented on the outside of the diagrams and the inland towns in the interior. The graphs commence with the month of April, as in this month a distinct change of season sets in; beginning from then, the average temperature falls (rapidly at first and more gradually afterwards) and begins to rise again on or about July. In this way both fall and rise are more conveniently displayed for comparison than if the graphs were commenced with January in the usual way. In order to make the comparison more complete, the monthly averages for the maximum and minimum temperatures are displayed in a similar manner on a second series of charts (Fig. IV.).

The graphs make it clear that the climate of the coastal towns differs essentially from that of the inland towns. The former towns have, on the whole, higher wet and lower dry bulb readings than the latter. With the coastal towns the average readings increase gradually with decreasing latitude and the contrast between the cool and hot season becomes less and less pronounced. The charts of Rockhampton and Thursday Island, the two extreme towns of Queensland, situated within the tropics, illustrate this contention. In Rockhampton (latitude 23° 24′) the coolest month (July) has average dry and wet bulb readings of 16.3° C. (61.4° F.) and 13.3° C. (56° F.) respectively and the hottest month (January) has readings of 27° C. (80.6° F.) and 22.7° C. (73° F.) respectively. The average dry bulb temperature is therefore 10.7° C. (19.2° F.) higher and the average wet bulb reading is 9.4° C. (17° F.) higher in January than in July. In Thursday Island, however (latitude 10° 34′), the corresponding averages are 25.8° C. (78.3° F.) and 23.2° C. .(73.8° F.) for July respectively and 28.1° C. (82.7° F.) and 25.9° C. (78.7° F.) for January, showing much smaller differences, namely, 2.3° and 2.7° C. (4.4° and 4.9° F.) respectively. In other coastal towns, such as Darwin, Wyndham and Broome, situated on the northern coast of Australia, the seasonal variations are more pronounced when compared with Thursday Island. During the hot season the average readings there are higher than in towns on the eastern coast in the same latitude. Broome and Innisfail, for example, both situated between 17° and 18° South, show this difference in a marked degree (see charts), but the geographical position alone explains this difference, since Innisfail lies within the region of the trade winds, and, in addition, possesses a larger average rainfall.

For comparison only, graphs representing the climates of Daru, Port Moresby and Samarai, all in Papua, have been added (Fig. V.). These graphs do not differ essentially from those of Thursday Island.

In most of the inland towns of Northern Australia weather conditions are greatly influenced by altitude and changes with latitude are consequently less pronounced.

The graphs representing the average maximum and minimum temperatures exhibit the same seasonal variations, which in the coastal towns become less marked with decreasing latitude and show smaller ranges of temperature. In the inland towns the average maximum readings in general are much higher and the average minimum readings much lower than in towns on the sea coast.

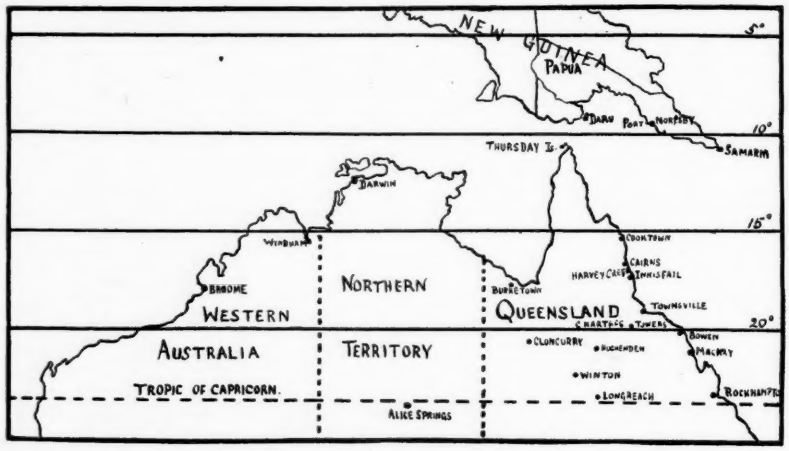


FIGURE III.

A comprehensive account of the distribution of rainfall throughout Northern Australia has been published by Hunt in a series of monographs issued by the Meterological Bureau. The rainfall in North Queensland shows a seasonal distribution corresponding to the monsoonal type of climate, the heaviest falls taking place during the hot months (December to March) and only occasional showers occur during the cooler months.

There is a "wet belt" on the north-eastern coast, the centre of which lies about Harvey Creek and which extends northward to a point beyond Port Douglas and southward as far as Halifax, where a very high general rainfall is registered (see Table I.).

TABLE I.—RAINFALL.

Cooktown	181.9 cm.	(71.6 inches)
Port Douglas	210.6 cm.	(82.9 inches)
Cairns	229.9 cm.	(90.5 inches)
Harvey Creek	426.0 cm.	(167.7 inches)
Innisfail	384.0 cm.	(151.2 inches)
Cardwell	218.6 cm.	(86.1 inches)
Halifax	226.6 cm.	(89.2 inches)
Ingham	204.5 cm.	(80.5 inches)
Townsvillle	125.2 cm.	(49.3 inches)

The inland towns, on the whole, are much drier than the coastal towns and show a similar seasonal distribution of rainfall.

In the coastal towns of other parts of Northern Australia conditions similar to those of North Queensland prevail, with the one difference that Broome and Wyndham show a comparatively small average rainfall, namely, 58.2 cm. and 71.4 cm. (22.9 inches and 28.1 inches) respectively. In New Guinea, Port Moresby and Daru, both situated within the monsoonal belt, possess in the same way a dry and wet season, whereas Samarai has its rainfall of 296.4 cm. (116.7 inches) more evenly distributed over the whole of the year.

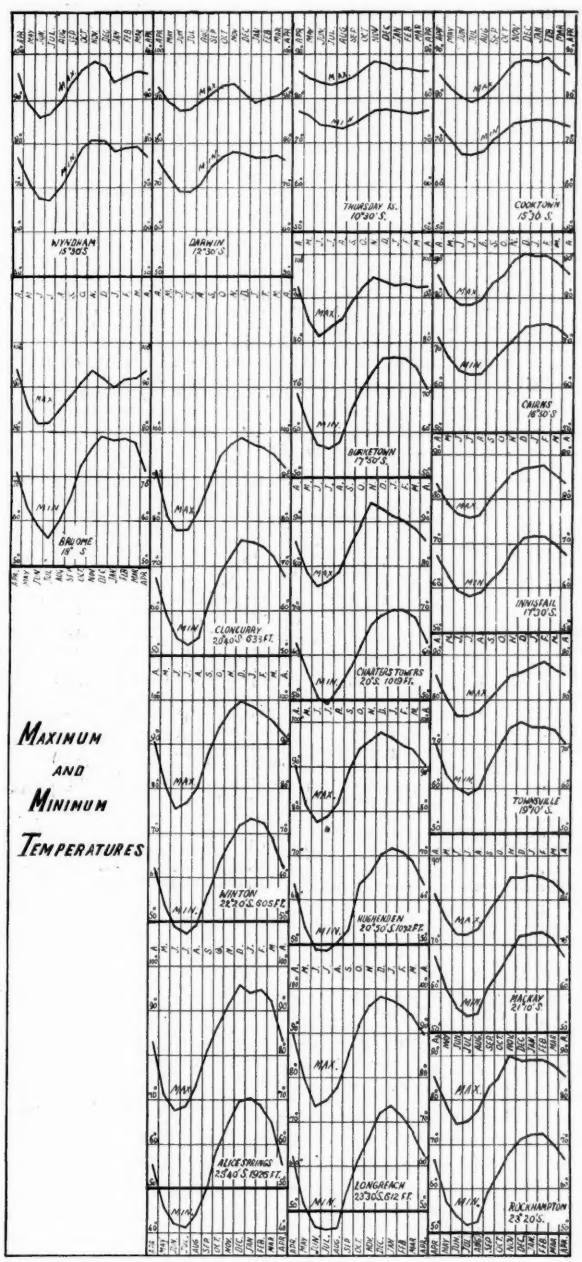


FIGURE 4.

Sunlight in the Tropics.

The main difference between a temperate and a tropical climate lies in the greater intensity of the sun's rays in the tropics. This greater intensity is solely due to the less oblique path of the rays striking the earth, whereby they have thus passed through a smaller layer of atmosphere. As a result, a less degree of absorption and scattering has taken place, and the chemical and physical activities of these rays are therefore greater the nearer to the equator. This greater activity of the sun's rays manifests itself in everyday life. The newcomer to the tropics soon becomes aware that coloured materials, such as curtains, carpets and clothing fade quickly and written matter in ink, when exposed to the sun, gradually gets fainter, and, after a time, almost disappears. Similarly, a number of chemical preparations decompose, rubber rapidly perishes and certain qualities of glass are altered. The frosting of glass flasks, microscopic slides and high power lenses are examples only too well known to laboratory workers in the tropics.

The bactericidal action of sunlight has been known for a long time and has been investigated again recently by Clemesha (1912) in India, who exposed cultures of fæcal bacteria to the sun. In other experiments he added large quantities of fæces to water contained in a tank with a large surface area (0.6 hectares, or 1 acres) exposed to the sunlight and examined the liquid from day to day for bacterial content. Furthermore, he studied the bacteriological flora of waters of natural lakes during the monsoonal and dry seasons. All these inquiries led him to conclude that the sun has a very powerful action in destroying fæcal organisms in water.

Such changes as the above, together with numerous others of a similar nature, led to the question of the nature of the rays producing these results. Are they brought about by those rays of shorter wave length in the violet and ultra-violet portions of the solar spectrum (chemical rays), or are they to be attributed to rays of longer wave length, situated at the other end of the spectrum, the red and infra-red rays (heat rays)? The ultra-violet rays are known to increase chemical activity and many chemical reactions and decompositions may be brought about by exposure to these rays. An example is the decomposition of oxalic acid into carbon monoxide, carbon dioxide and water when exposed to the sun in the presence of a uranium salt. This decomposition is almost entirely due to those rays of the solar spectrum in the ultra-violet extending from 550 $\mu\mu$ to 291 $\mu\mu$ (Freer, 1912). Observers in the Philippines attempted to make use of this decomposition of oxalic acid under standardized conditions, in order to compare the intensity of the ultra-violet rays of the sun in different

parts of the world. The results, however, showed that the amount of decomposition in the Philippines and other parts of the tropics was inconstant and did not bear any definite relationship to latitude. The figures obtained by the same method in a temperate zone were sometimes as high and even higher than those found in the tropics.

The extensive observations of the Philippine workers have led them to the conclusion expressed by Aron (1911): "That the spectrum of the sun's rays does not extend much, if any, further into the ultra-violet in Manila than in northern climates." These observers do not agree with Woodruff (1905) and others, who attribute the effects of tropical sunlight on the human organism to the influence of ultra-violet rays only. Aron (1911) believes that "the rays of the tropical sun, having greater wave length than those in the red and ultra-red end of the spectrum, play the most important rôle in producing the untoward effects generally attributed to tropical sunlight"; in other words, he attributes such effects to the heat rays alone.

Gibbs (1912), working in conjunction with Freer and Aron, expresses a somewhat similar opinion, and, if altitude and local meteorological conditions are taken into consideration, he does not believe that "when the normal intensities are compared, the light of the tropics is different from the sunlight of any other regions." Effects upon life in the tropics, usually attributed to sunlight, are, in his opinion, due to "other meteorological modifications, which go to make up climate, namely, duration of sunshine, clouds, rainfall, winds and humidity, all of which affect the air temperature; the last is probably the most important fact and depends to a large extent upon the duration of sunshine."

In Manila and Baguio, both in the Philippines, Aron (1911) and Gibbs (1912) carried out experiments on animals in order to study the effects of exposure to the sun's rays under varying conditions. Different experimental animals, such as rabbits and monkeys, were exposed to the midday sun for varying periods. These animals, when shielded from draughts, died after an exposure of from thirty-four minutes to about one and a half hours, and showed the post-mortem appearances characteristic of heat stroke. Black rabbits, as a rule, succumbed more quickly than light-coloured animals and it was noticed that the subcutaneous temperatures, taken by means of a thermo-couple, in the case of black rabbits, rose quicker and higher than in that of the lighter-coloured ones.

Aron, furthermore, carried out exposure experiments on dogs which had been tracheotomized and thus had part of their effective heat-regulating mechanism put out of action.[1] It is well known that dogs do not possess sweat glands on the body, but keep their body temperature from rising by means of an increased rate of respiration and an increased evaporation from their respiratory tract. These animals died after about an hour with typical symptoms of heat stroke and corresponding post-mortem appearances. In a similar manner the body temperature of tracheotomized rabbits rose on exposure to the sun more rapidly than that of normal rabbits.

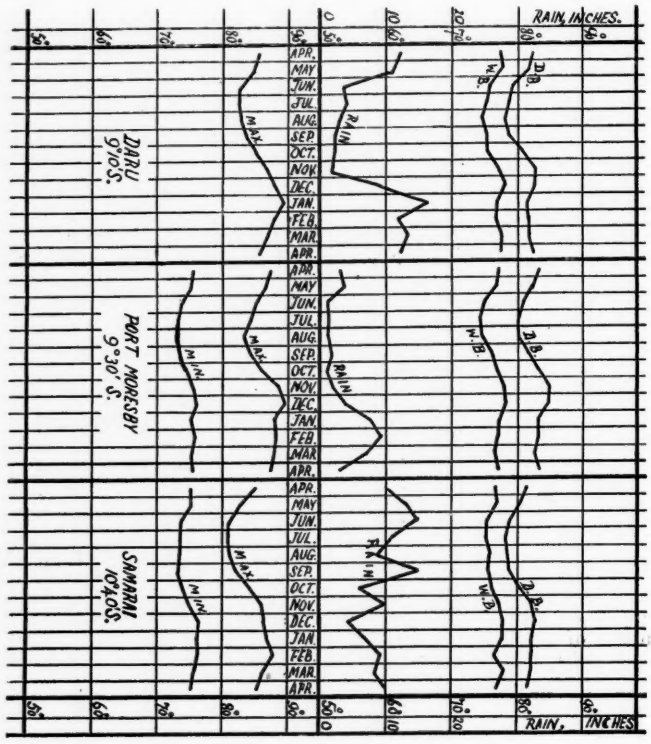


FIGURE V.

When monkeys were exposed to an artificial draught during the experiment, or were protected by shade from the direct sun rays, no injurious effects were noticed. These experiments, according to Aron (1911), show that "when placed under the fan animals lost the excessive heat which reached them by radiation from the sun. Rays including the ultra-violet were nevertheless present and were absorbed by the body in the same manner and degree as by that of the control monkeys."

These experiments have recently been repeated by Shaklee (1917) and further amplified, to ascertain whether it is possible for monkeys to become accustomed to the sun (acclimatized) by a gradually increasing daily exposure. His results differed from those of Aron, as several of his monkeys, even in the beginning of the experiment, lived for hours in the

[1] Considering the relatively small surface of mouth, nose and throat above the tracheotomy wound, compared with the breathing surface of the lungs, it is evident that the operation had put out of action only an extremely small portion of the respiratory surface, and cannot altogether account for the quicker death of these animals.

direct sunlight without being protected in any way. Summarizing his results, he states that experimental monkeys, exposed to the sun in Manila, may die from heat stroke after varying periods, depending to a less extent upon the sun's rays than on other local conditions, such as proximity of a large, hot surface (ground or roof), high relative humidity of the atmosphere and low wind velocity. Monkeys, however, may become temporarily acclimatized by gradually increasing the time of exposure to the sun. This, in his opinion, increases the sensitiveness of the nervous mechanism which regulates body temperature by an increased rate of perspiration. The fact that administration of atropine, which impairs the function of the sweat glands, causes the death even of an acclimatized monkey on exposure, is evidence in support of this conception.

Animal experiments were also carried out by Schmidt, who, working in a temperate climate, exposed rabbits to the sun and found a rise in the anal temperature which was more pronounced in a black than in a white rabbit. In the same way Schilling (1909) observed a rise in the skin temperature of rabbits exposed to the sun and several other authors have made similar observations. It must be kept in mind, however, that the temperature of rabbits varies considerably even under normal conditions, and the struggling alone, when the animal is handled, may cause a considerable rise.

It is not a new observation that animals, even in a temperate zone, may succumb to exposure to the sun, as the following example illustrates. In a laboratory in the north of England, in which monkeys were kept in a glass house, on more than one occasion during the summer months several animals died under the symptoms of heat stroke, showing an ante-mortem rectal temperature of 43.3° C. (110° F.), which still rose after death. The painting of the glass roof with a white wash reduced the inside temperature of the animal house and prevented death.

A consideration of the foregoing observations makes it evident that exposure to the direct sun's rays caused such an increase in body temperature that the animals finally succumbed to hyperpyrexia. In every case animals of dark colour died more quickly than those with light fur, on account of the greater absorption of heat.

The dark skin of most of the aboriginal races in the tropics, from the above point of view, would appear to be a disadvantage and the explanation that dark skin affords protection against the effects of the sun merely by insulating the body against the deep penetration of harmful rays must be modified.

Attempts to elucidate the rôle played by the pigment in a protective sense are not lacking in the literature. Eijkman (1895), in Batavia, covered the bulbs of two thermometers with pieces of white and coloured human skin and placed the thermometers in the sun. He noticed that the brown skin caused a higher rise of the mercury (50.1° C.) than the white skin (47.5° C.).

Aron (1911) and Gibbs (1912), in the Philippines, experimenting with live skin, exposed white and coloured persons to the sun and recorded the skin temperatures of various parts of the body by means of a thermocouple. Their results were somewhat inconstant; the skin temperature invariably rose after a time to from three to four degrees above normal. Whilst Gibbs found temperatures distinctly higher for the dark skin, Aron noted that the white skin was always hotter than the brown, and that after prolonged exposure the temperature of the brown skin showed a more distinct fall. "It may be said," as Freer (1912) remarks in summarizing the results of both investigators, "that as regards rise in temperature on exposure to the sun, the white and brown skin (Filippino) are about equal, with a slight factor in favour of the white, but that in regard to the very dark skinned negro the temperature on exposure reaches a decidedly higher point than it does with either of the others." In its physiological action, on the other hand, the dark skin is superior to the white skin. It absorbs a greater quantity of heat rays, warms up more quickly and reaches the point where perspiration commences earlier and the evaporation of the sweat causes heat loss and consequently affects the cooling of the body.

A consideration of the foregoing experiments and observations upon the effects of exposure to the sun suggests that any ill-effects are due not to light but to heat. These experiments, however, only take into consideration those effects known as sun stroke or heat stroke, and it is, moreover, an almost impossible task in such experiments to study the physiological action of the other rays with the entire exclusion of heat rays.

The effect of sunlight on living organisms has formed the subject of many publications and many opinions have been put forward which are not founded upon facts but are only wild speculations. Woodruff (1905), for example, wrote an extensive monograph on the effects of tropical light on the white man, and his conclusions have been widely quoted in the literature. He contended that the ultra-violet rays of the tropical sun are inimical to white settlement, but, unfortunately, he based many of his arguments on false premises, and many of his statements were merely expressions of personal opinion. As a glaring example, the following sentence may be quoted: "The southern hemisphere, except the tip of Patagonia, is north of 45° and therefore unfit for blondes" (he assumes that a blonde race cannot live nearer to the equator than 50°) and "even in New Zealand and Australia the native white families are already dying out or kept alive by constant new importation from home." He assumes, further, that in New Zealand there is ample evidence of the physical decay of the white population. In view of such statements, entirely without foundation, it is difficult to consider any of his conclusions seriously.

(To be continued.)

NOTES ON EPIDEMIC BRONCHO-PNEUMONIA (SPANISH INFLUENZA) IN SAMOA.

By **Francis Temple Grey, M.B. (Syd.),**
Surgeon Lieutenant, Royal Navy, Officer Commanding Samoa Relief Expedition, 1918.

This epidemic arrived from New Zealand, November 7, 1918. Natives from different parts of the group had assembled in Apia to meet friends coming from New Zealand, went on board and carried infection back to the most distant parts of the group.

After an incubation period of two days, the scourge was raging through the group, rising to its height on the tenth day, by which date it is calculated that in Upolu alone two thousand had died. The ages most prone are 18 to 35 and the old. It is more fatal for men than women as 15 : 13.[1] The ages least prone are six to eighteen and thirty-five to forty-five. The incidence amongst the natives (for it is with their epidemic I was chiefly concerned) was 80% and as the total deaths number almost exactly one fifth of the entire population (to be exact, 7,264 out of 36,405), this means a mortality of 25% for the disease.

To this high mortality the following factors contribute:—

(1) The natives, although apparently of fine physique, have generally a poor chest expansion.

(2) From smears examined it appears that the potential pathogenic respiratory flora of the whites are not found amongst the natives in the natural state nor have they any immunity to the toxins of these organisms. Coryza is in any case uncommon amongst the whites in the tropics.

(3) The natives are generally remarkably free from sickness and when an illness with marked malaise visits them, they make up their minds to die; not that they are fatalists, but they have not the will to live that the white man has. They are not in the least upset by the loss of relatives.

(4) The native house or "fale" is normally a healthy place; it has a raised floor of coral and lava pebbles, no walls and a thatch roof supported on poles. These houses are healthy and airy and do very well for the nursing of patients suffering from pneumonia. A whole family (children, parents and grandparents) live in a fale and sleep on mats. Generally the natives are cleanly in their habits and spit outside the fale, although apart from some affection of the respiratory tract (which they bear ill) a healthy native rarely spits at all. The procedure early in the epidemic was that when a native fell ill, he lay down in his hut and all his family, having pulled down the blinds which normally come down only in wet weather, lay down too in sympathy; all then became infected. When the fever was at its height, on the third day, the natives would cast off their clothes and pull the blinds up, the men often going into the sea to cool themselves; this of course determined a pneumonia, although in any case few even with precautions escaped a broncho-pneumonia, except children.

(5) The natives are very lazy and spend the livelong day squatting *faa Samoa* (Samoa fashion). The women do a certain amount of work and it is to be noted that they were less affected. The islands contain abundant food and the only serious work done is food collecting by the young men; the collecting of yams requires a certain skill.

(6) At the height of the epidemic many lives were lost by famine consequent on the cessation of food collecting. The Administration did what they could by supplying all the rice and condensed milk they had.

(7) Before we introduced supervision, patients would go into the bush for necessary purposes and often die there.

(8) The natives are helpless without their chiefs, and most of these succumbed.

(9) Foster mothers were difficult to obtain for motherless infants who, before our arrival, would succumb either to starvation on the one hand or to gastro-enteritis on the other. Gastro-enteritis in the normal state appears to be curiously uncommon amongst native infants, although fed most injudiciously from our point of view: bananas, bread fruit, taro, pine apple; in short, the identical food of adults in small quantities.

(10) The medicine men before our arrival had already done a good deal of damage. These wretches treat *inter alia* conjunctivitis by scarification and instillation of an irritant, never failing to cause blindness by the consequent corneal opacities. Abscesses are incised regardless of the anatomy of the part, with results that may be imagined.

(11) No facilities for the isolation of infected persons existed at the outbreak of the epidemic.

On the same day in both islands, *viz.*, Saturday, December 8, 1918, food collecting was resumed and the breaking of the back of the epidemic is popularly dated thence.

Broncho-pneumonia (75% of chest cases) and pneumonia (25%) are to be considered rather as an integral part of the disease itself than as complications, seeing that 5% only of adults escape. It is not a question of "picking up a patch of tubular breathing," but the whole base, in the case of the pneumonias, becomes so rapidly involved in the process that the merest tyro with the stethoscope could not miss the awful sounds (for it amounts to that) one hears in the lungs of these unfortunate people.

Cholangitis was seen in about 1% of adults and in 1% of children; parotitis sometimes going on to suppuration in about 5% cases. Two cases of suppurative periphlebitis and three cases of post-influenzal insanity were noted. No endocarditis was seen. Rare complications were orchitis, arthritis, meningitis, lymphadenitis and pleurisy. Empyema was very rare, only one case being seen outside Apia.

As to type, the vast majority were of the pneumonic, the nervous and enteric types being very rare.

The disease is ushered in suddenly with headache and fever and pains in the legs. Uncomplicated it has a course of three days as seen in young children who perspire profusely for three days and are up and about on the fourth. Adults too often got up on the fourth day, but then almost invariably came down with pneumonia. In any case broncho-pneumonia usually set in on the fourth day. Fatal cases showed marked dyspnœa, cyanosis and delirium.

There was neither time nor opportunity to do any post-mortem work; the native prejudices in this respect are almost insuperable.

Neither culture media nor the necessary raw materials were to be found, nor is there any seaweed in these islands; and not till after Christmas did the media arrive which I had cabled for from New Zealand. By this time, of course, my material had

[1] In the Island of Savaii, where 2,816 died, 1,232 were men, 1,019 women, 292, boys, 273 girls.

practically disappeared, but in six consecutive cases I grew Pfeiffer's bacillus and a hæmolytic streptococcus and was successful in subculturing Pfeiffer's bacillus no less than four times. I had already noticed in my smears that a Gram-negative bacillus (presumably Pfeiffer's) was easily seen early in the disease (the first four days) and was thereafter displaced, apparently in geometrical progression, by a streptococcus.

In twenty fresh films I saw organisms morphologically indistinguishable from Pfeiffer's bacillus no less than fifteen times; streptococci were seen in every case; the pneumococcus ten times; the *Micrococcus tetragenus* in every case; a Gram-negative diplococcus morphologically indistinguishable from the *Micrococcus catarrhalis* only four times; the *Diplococcus crassus* three times; the tubercle bacillus and the pneumo-bacillus of Friedländer twice and a Gram-positive bacillus (not acid fast) once.

Smears from five empyemata all contained pneumococci and from eight cases of suppurative parotitis showed a streptococcus in every case, the pneumococcus five times and a Gram-positive bacillus (not acid fast) once.

Of fifteen blood samples examined, four from cases of parotitis and five from cases of empyema showed a leucocytosis, and six from cases of broncho-pneumonias a leucopenia. No organisms were grown from the blood.

We were too late to know whether any drug is specific, although good results were reported from the use of quinine as a prophylactic before we came. My experience inclines me to this view: all my officers and men were kept under the influence of quinine. Hydrotherapy, strophanthus and brandy were of therapeutic value, as also acetyl-salicylic acid and potassium nitrate.

The high incidence (60%) and the low case mortality (2%) for whites of a disease brought from New Zealand where the mortality touched 10% suggest, when one considers the high bactericidal action of direct sunlight, that the disease is mitigated for whites in the tropics.

The extraordinary value of the vaccine supplied me from the Commonwealth Serum Laboratories has formed the subject of a previous communication.[2] A full dose contained 125 millions of *Micrococcus catarrhalis*, 50 millions each pneumococci, streptococci and of a Gram-positive diplococcus. That experience shows Pfeiffer's bacillus to be unnecessary as a constituent of a vaccine directed against this epidemic and in view also of the risk of a negative phase, it is in any case clearly unwise to use it in any community where the epidemic is already well under way.

If Spanish influenza be caused by a streptococcus[3] for which the way has been prepared by, say, the bacillus of Pfeiffer or a filter passer, and especially if this last represent a stage in the development of the streptococcus, an anti-streptococcal vaccine should be, and in my experience has been, competent to protect.

In the middle of March (a fortnight after my first communication[4] was submitted), an epidemic broke out in the ship referred to in paragraph one and by the end of the month there were about one hundred cases with no deaths. Inoculations (end November and end December) appear therefore to have given immunity up to the middle of March and when the disease broke through to have rendered it non-fatal. To deny mitigation by inoculation in this case is to say that the disease was not Spanish influenza (which has a high mortality) and therefore that the immunity was absolute.

Soon after my first communication was submitted, an influenzoid epidemic broke out in the Naval Depôt at Williamstown and within a fortnight we had a hundred cases (characterizezd by high infectivity, extraordinary mildness and an average age incidence of 18½). I regarded this as a separate clinical entity, but if it were Spanish influenza then the case for inoculation is stronger than ever.

[2] Grey, *The Med. Journ. of Aust.*, April 12, 1919.
[3] I include in this term the pneumococcus.

[4] Grey, *l.c.*

Reviews.

WAR SURGERY.

A concrete example of the industry and foresight of our American confrères is to be seen in "Abstracts of War Surgery,"[1] published by the Division of Surgery, Surgeon-General's Office, Washington.

It is a volume unrelieved by illustrations, in which are aggregated together many articles from various journals of different nations recently at war. The American Army Medical Staff faced service at a stage made easier by the experience of earlier combatants. A machine had been pieced together as nearly perfect, in France at least, as one could wish. The lessons of South Africa had been dearly bought, but they were not forgotten. Even yet, there is no adequate realization of the triumphs gained by preventive medicine in this war. It was not the lot of American medical officers to stumble suddenly on numerous cases of tetanus before the use of prophylactic serum had become a routine. It was their privilege also to watch the treatment of war wounds graduate through the tragedy of expectancy and the failures of hypertonic saline solution to the security of Carrel-Dakin's technique. Gas gangrene was already by comparison but a casual visitor in the wards when the American armies reached France. Yet it must be said for the American side that they followed developments from the first with observant eyes and keenly critical minds, quick to seize on the new and the valuable.

In this book then we see a sort of ready reckoner of surgical treatment prepared for the use of surgeons new to war. Its defects are obvious. There is too much a suggestion of the scrap-book, of editing by scissors and paste. But its value to the newly enrolled, about to start on a pilgrimage of strange experiences, cannot be gainsaid. If that value has become depressed by the cessation of the conflict, it is merely sharing the fate of many other manuals of war work. It will still remain as an epitome of international opinion on many problems, in the treatment of which not a few principles may have a valuable application in civil surgery.

WAR WOUNDS.

Henri Hartmann is so well-known as the Professor of Clinical Surgery at the Hôtel Dieu, Paris, that his recent work, *"Plaies de Guerre,"*[2] may be taken as representative of French surgical opinion. The subject is compressed within the narrow compass of eighteen lectures, and it would be

[1] Abstracts of War Surgery: An Abstract of the War Literature of General Surgery that has been Published since the Declaration of War in 1914. Prepared by the Division of Surgery, Surgeon-General's Office (United States of America), 1918. St. Louis: C. V. Mosby Company: Melbourne: Stirling & Company: Demy 8vo., pp. 434. Price, $4.00.

[2] Les Plaies de Guerre et Leurs Complications Immédiates, Leçons faites à l'Hôtel Dieu; par Henri Hartmann; 1918. Paris: Masson et Cie; Royal 8vo., pp. 200. Price, 8 francs.

vain to expect that anything more than broad general outlines could be laid down. Obviously, they are meant for the newcomer in war surgery, and to such an one their simplicity and lucidity must make a strong appeal.

The lecture on traumatic shock, however, is disappointing. It is a pity that an effort is made to galvanize life into the Crile theory at the early demise of which Carman and others have assisted. Still more serious is it to read of treatment based on the Crile conception. Adrenalized artificial serum is advocated and no mention made of the widespread use of blood transfusion, in which so many surgeons had found new hope for the treatment of the shocked. In the unsatisfactory treatment of established tetanus Hartmann trusts to subcutaneous injections of carbolic acid, a method which most surgeons have discarded. No mention is made of the intrathecal injection of antitoxin, which is still under evaluation. A carefully conservative attitude is adopted in regard to intervention in wounds of the closed thorax for those symptoms of collapse which are attributed to intra-thoracic hæmorrhage alone, but which, according to Hartmann, are not proportionate to, nor entirely dependent on, the blood loss.

The success of Duval's methods and their originality will doubtless, for a time, swing the pendulum violently towards intervention, but past experience of similar discoveries has taught us to expect it later to oscillate over a smaller arc. The treatment of open thorax, of course, if success is to be hoped for, must always be by surgery and immediate surgery. The lecture on frost bite is interesting, and the experiences of Larrey in the Wars of the First Empire are quoted in proof of the well-recognized fact that it is moist cold that counts most in the ætiology of these cases. It is suggested that the higher frequency of these cases in the men than in the officers is to be explained by the duties of the latter being of a more active character; they are less chained to their post in the trenches.

Public Health.

THE HEALTH OF AUSTRALIA.

Infective Diseases Notified in Australia During the Quarter Ending December 31, 1918.

	New South Wales.		Victoria.		Queensland.		South Australia.		Western Australia.		Tasmania.		Commonwealth.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.[1]	Deaths.
Enteric Fever	193	25	55	5	99	12	27	0	56	3	14	1	444	46
Scarlatina	222	3	596	8	48	0	273	5	217	5	9	0	1,365	21
Diphtheria	746	29	1,330	41	376	8	308	12	226	3	101	3	3,087	96
Pul. Tuberculosis	328[2]	295	401	249	127	94	111	86	95	52	64	27	—	806[3]
C'bro-Spinal Menin.	22	10	13	8	6	5	4	1	10	3	4	1	59	28
Poliomyelitis	6	2	2	1	9	2	—	1	0	0	1	0	—	6
Malaria	2	0	0	1	0	8	0	1	5	0	—	0	—	11[4]
Puerperal Fever	—	16	15	17	9	7	1	6	1	2	3	4	—	52
Septicæmia, Pyæmia	—	9	0	11	—	2	—	4	2	2	—	1	—	29
Bilharziosis[5]	—	0	—	0	0	0	2	0	1	0	0	0	—	0
Morbilli	—	31	0	3	—	2	219	1	—	0	—	1	—	38
Pertussis	—	52	0	20	—	12	370	4	—	6	—	3	—	97
Ophthal. Neonatorum	—	0	0	3	—	0	—	0	0	0	—	0	—	3
Erysipelas	—	9	0	5	29	1	34	3	12	1	—	0	—	19
Anchylostomiasis	—	0	—	0	9	1	—	0	—	0	—	0	—	1
Favus	—	0	—	0	—	0	2	0	—	0	—	0	—	0
Beri-Beri	—	0	—	0	—	0	—	1	4	1	—	0	—	3[4]
Low Fever	—	—	—	—	—	—	—	—	1	—	—	—	—	—

Infective Diseases Notified in Australia During the Year 1918.

	New South Wales.		Victoria.		Queensland.		South Australia.		Western Australia.		Tasmania.		Commonwealth.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.[1]	Deaths.
Enteric Fever	830	107	474	48	519	54	157	10	250	22	151	10	2,381	251
Scarlatina	1,337	16	3,116	40	366	5	683	4	915	10	56	1	6,473	81
Diphtheria	5,311	209	8,058	198	2,325	68	1,478	64	1,236	26	610	20	19,018	607
Pul. Tuberculosis	[2]1,313	1,090	1,685	941	486	337	477	237	376	244	191	92	—	3,038[6]
C'bro-Spinal Menin.	129	73	66	40	69	39	25	9	17	6	11	5	317	173
Poliomyelitis	50	6	313	39	22	18	—	6	4	1	16	2	—	72
Malaria	10	2	0	2	47	34	0	1	10	0	0	0	—	41[3]
Puerperal Fever	—	83	27	45	33	22	8	13	4	10	16	10	—	183
Septicæmia, Pyæmia	—	42	0	37	—	14	—	9	16	8	—	1	—	111
Bilharziosis[5]	—	1	—	0	7	0	2	0	14	0	0	0	—	1
Morbilli	—	65	—	8	—	3	282	4	—	3	—	2	—	72
Pertussis	—	106	—	66	—	32	682	5	—	16	—	9	—	234
Ophthal. Neonatorum	—	3	—	4	—	0	—	0	2	0	5	0	—	7
Erysipelas	—	16	0	18	118	8	156	8	64	5	—	1	—	56
Beri-Beri	—	0	—	0	—	6	—	1	13	5	—	0	—	15[3]
Anchylostomiasis	—	0	—	0	27	1	—	0	—	0	—	0	—	1
Variola	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Dysentery	—	0	—	0	2	0	—	0	—	0	—	0	—	0
Low Fever	—	0	—	0	—	0	—	0	1	0	—	0	—	0
Favus	—	0	—	0	—	0	9	0	—	0	—	0	—	0

[1] The total number of cases notified is not given of those diseases which are not notifiable in all the States.
[2] Notifiable only in portion of the State.
[3] Including three deaths in Northern Territory.
[4] Including one death in Northern Territory.
[5] Including Hæmaturia.
[6] Including eleven deaths in Northern Territory.

The Medical Journal of Australia.

SATURDAY, MAY 3, 1919.

A Perennial Defect.

During the year 1918 19,018 cases of diphtheria were notified in the Commonwealth and there were 607 deaths from this disease. It is quite certain that the number of infections was considerably greater than the number of cases notified. Some practitioners are notoriously careless in respect to the duty of reporting cases of infectious disease to the health authorities. In many other cases medical aid is not sought. It is, however, unnecessary for our present purpose to raise the question of unnotified cases. In a population of approximately 5,000,000 human beings, nearly 20,000 are known to become infected in one year with a dangerous disease. This means that four persons out of every thousand were infected with diphtheria in one year. It so happens that we possess a specific remedy for this disease. If given early enough in the course of the disease deaths can be prevented altogether. It is not always possible to prevent a fatal issue, since the patient is often not seen until the disease has developed beyond the limit of safety. The case mortality, calculated on the number of reported cases, was 3.14%. In three States it was below 3%, namely, in Western Australia is was 2.1%, in Victoria it was 2.45% and in Queensland it was 2.92%. In Tasmania the case mortality was 3.27%, in New South Wales it was 3.93% and in South Australia it was 4.33%. Expressed in another way we find that twelve persons in each 100,000 of population died last year from diphtheria. It can scarcely be questioned that diphtheria can be checked, if not entirely prevented. It is a matter of spending a certain amount of money and devoting a certain amount of energy. In every State this disease has to be notified by the medical practitioner attending the patient, or by some person in the household. In every State the law is very definite in regard to the responsibilities of medical practitioners attending patients who are suffering from certain infective diseases. The notification is compulsory and failure to obey the law renders the practitioner liable to a fine. The information is necessary, if preventive measures are to be carried out. In the majority of the States failure to notify is not followed by prosecution. In every State some facilities have been provided for the routine bacteriological examination of the faucial mucus of patients and of those who have been in contact with them. There is thus no difficulty in determining an infection or in recognizing when a person is capable of infecting a healthy person. It has been demonstrated times without number that an epidemic of diphtheria can be arrested by tracing the source of infection, by cutting off this source and by controlling the persons who could act as secondary starting points of infection. It is true that the so-called chronic carrier may present a difficulty, since weeks or months are at times needed before these individuals can be rendered harmless. But this difficulty is not insuperable. The health authority should provide adequate machinery to investigate the source of infection in every case notified. It is waste of time, money and energy to relegate the duty of investigating the conditions to a sanitary inspector. The discovery of some defect in the house drainage is, no doubt, important, but this knowledge will not cut off the source of infection. A properly trained medical officer of health should use all his faculties within a few hours of the notification to discover the source of infection, and having discovered it, he should take the necessary steps to prevent further infection from this source. He should also ascertain the names of all persons who had been in contact with the patient from the time of the appearance of the first symptoms, and each one of these persons should be regarded as a potential spreader of the disease until he is proved by bacteriological examination to be harmless. This search may involve a wholesale bacteriological examination of children attending a school, or even a routine examination of every inhabitant of a village. But since the object in view is to reduce the 19,000 or more infections per annum to a negligible quantity, neither lack of funds nor a shortage of medical officers constitutes an excuse for leaving it undone. Money must be provided for such a purpose and with money the services of a sufficient number of trained medical officers can be secured. In the campaign against diphtheria there is no need

for a public scare. The disease is definitely preventible and it should be prevented in the Commonwealth. This is not the only disease that is unnecessarily prevalent. We need but to instance the 2,381 cases of enteric fever which were notified in 1918, with a case mortality of over 10%. It is possible to prevent enteric fever, although this task is more difficult than the task of preventing diphtheria, since it involves the collaboration of the public, and since the carrier problem is more serious in the instance of enteric fever. It has been stated that the efficiency of a health department can be measured by the incidence of diphtheria in the area under its control. Judged from this standpoint, health control needs revision in the Commonwealth.

AN EXOTOXIN OF PFEIFFER'S BACILLUS.

In the early days after Pfeiffer described the *Bacillus influenzæ*, Kolle and Delius undertook some pains-taking experiments for the purpose of ascertaining whether it was possible to immunize animals against this bacterium. Guinea-pigs, rabbits, dogs, sheep and goats were injected with the bacilli, both living and dead and also with filtrates of broth cultures, but in no single instance did any protection against the infection arise. In the next place they endeavoured to influence the course of the disease by injecting the serum of persons suffering from influenza, but failed completely to effect a modification of the illness. Finally they noted that while influenza bacilli were found to be growing freely in the cavities of the lungs in tubercular subjects, these persons did not reveal the slightest immunity to influenza. Since these authors published their results in 1894, many others have again attacked the problem and have with striking regularity registered negative results. In the present pandemic numerous attempts have been made to obtain a direct immunity to the influenza bacillus. As far as we are aware only one investigator has been able to produce any evidence of immunity to the influenza bacillus and in this series of experiments very prolonged treatment resulted in a bare raising of the resistance to a fatal dose of the organism. A number of workers have treated influenza with the serum of convalescents and while a few have thought that this treatment reduced the incidence of the lung involvement complicating the disease and consequently the mortality, the majority have failed to recognize any distinct advantage of this treatment. No one has succeeded in preventing the onset of the influenza by pre-treating persons likely to be exposed to the infection with the serum of convalescents. It is therefore not surprising to find that the majority of observers deny that an immunity can be produced to the influenza bacillus and that it is possible to induce a resistance to the disease by pre-treatment with the bacillus of Pfeiffer or its products.

The experimental evidence available appears to demonstrate that the influenza bacillus of Pfeiffer does not produce any specific toxin. But since negative evidence is at best poor proof of the actual absence of any function, this aspect of the question has again been put to the test. Dr. Julia T. Parker, working at the Department of Bacteriology of the College of Physicians and Surgeons of the Columbia University, New York,[1] claims to have discovered experimental evidence that the bacillus does produce a toxin which is capable of being separated from the bacteria by filtration and that it is possible to immunize rabbits with this toxin. The method of production is of importance. A measured quantity of broth is placed in Ehrlenmeyer flasks and sterilized in the autoclave. To the broth is added sufficient sterile, defibrinated rabbit's blood to produce a 10% blood mixture. The flasks are then heated to 75° C. until the protein of the blood coagulates and settles on standing. The flasks are then inoculated with the contents of one or two slant cultures of *B. influenzæ* to each 50 c.cm. of blood-broth. After incubating the supernatant fluid is filtered through a Berkefeld candle. This filtrate proved to be toxic to rabbits, but the toxicity was shown to be of short duration. The lethal dose for a medium sized rabbit was found to be about 2 c.cm.. Dr. Parker states that there was no relation between the toxin formation and the amount of growth. She proceeded to immunize rabbits to this toxin and succeeded in producing a tolerance to four lethal doses. The serum of the treated rabbits neutralized the toxic action of the filtered broth *in vitro* and also prevented death from a single lethal dose if given either fifteen minutes before or fifteen minutes after the test dose of broth. The experiments appear to have been adequately controlled and to have been uniformly definite in their results. The toxic broth killed as a rule within three hours. For the first thirty minutes no symptoms developed. Then weakness appeared, accompanied by diarrhœa. At times death was heralded by convulsions. Dr. Parker used five strains of influenza bacillus, but found that the toxin derived from one strain was neutralized equally well by the immune serum prepared with the aid of another strain. Unfortunately she fails to report whether the broth was tested for toxic properties without the addition of bacilli and she also fails to adduce evidence of the absence of fragments of bacilli that may have passed through the Berkefeld candle. These filters are notoriously unsuitable for experiments dealing with filter-passing bacteria or other micro-organisms. Until every precaution has been taken and recorded to avoid fallacies due to the inefficiency of the candles or to the nature of the blood-broth, caution must be exercised in evaluating these results.

INFLUENZA IN LONDON.

Some figures published by the Registrar General in connexion with the deaths from influenza in London serve to present a picture of the severity of the late epidemic. During the four weeks ending November 2, 1918, the returns showed 4,156 deaths directly attributable to influenza, the weekly figures for the period being 80, 371, 256 and 2,458. In the same

[1] *Journ. Americ. Medical Assoc.*, February 15, 1919.

period the number of deaths from pneumonia was 1,127 and from bronchitis 481. The percentage of deaths from these conditions on deaths from all causes was for influenza 43, for pneumonia 12 and for bronchitis 5.

No outbreak of influenza in London has been so severe during the last 74 years, the period for which the office of the Registrar-General has been in existence. Since 1845 there have been only three influenza epidemics with more than 2,000 deaths. These epidemics lasted from April 26 to July 18, 1891, with 2,056 deaths, from December 27, 1891, to March 26, 1892, with 2,101 deaths, and from December 3, 1899, to May 3, 1900, with 2,050 deaths. The deaths in London in the first four weeks of the epidemic are almost as numerous as the total deaths in London from the complaint in the forty-six years from 1845 to 1890, in which period there were 4,690 deaths from influenza. In ten outbreaks, from 1909 to 1917, there were 4,329 deaths from influenza in London.

As regards the mortality at different ages in the epidemic in London at the end of last year, 80% of the total number of deaths from the illness were in persons under 45 years of age and 20% in those over that age. A comparison of the number of deaths from influenza with the total number of deaths from all causese at the several ages during the same week revealed that between birth and the fifth year the percentage of deaths from influenza was 34%, between the fifth and twentieth years the percentage was 63%, between the twentieth and forty-fifth years 64%, between the forty-fifth and sixty-fifth years 32%, between the sixty-fifth and seventy-fifth years 17% and for ages above seventy-five only 8%. These figures provide some interesting data for computing the relative severity of the epidemics at present raging in Victoria and New South Wales.

THE EPIDEMIOLOGY OF INFLUENZA.

Many of the problems connected with the pandemic of influenza await solution. The ætiology is necessarily in the hands of the worker in the laboratory, while information concerning its pathology must be sought from the pathologist working in the post-mortem room and from the clinician busy in the wards of our great metropolitan hospitals. Epidemiological data are being collected by public health experts and those who have facilities for collating the experiences gained at the bedside. The general practitioner is in a position to deliver valuable evidence for this purpose. We are therefore appealing to those who have had opportunity of observing many cases of influenza in private practice, to supply us with records more particularly in regard to the points mentioned below. The primary object of this enquiry is to endeavour to ascertain whether there is an essential difference between the influenza that was very prevalent during the late winter and autumn months of 1918 and the disease now epidemic in Victoria, New South Wales, South Australia and possibly other States. Incidentally it may be possible to utilize the information to establish or refute the proposition that the disease that was epidemic in South Africa, New Zealand, America and Europe is identical to that now invading Australia. It will be recognized that the experience of individual practitioners gains a practical importance in proportion to the number of records that can be collated. We would particularly ask those practitioners who are willing to place information at our disposal, to limit themselves strictly to personal observations and to indicate whether the data concerning the history of the infection was derived from statements of others or whether it was verified by the practitioners themselves.

The first matter on which we are seeking enlightenment is the type of illness arising from a known source of infection. Clinicians have indicated that the main characters of the present epidemic are blueness of the face, tongue and other parts of the body, disproportion between the pulse-rate, respiratory-rate and temperature and leucopenia. For the sake of clearness it is suggested that the cases should be regarded as either (*i.*) mild, ordinary or uncomplicated cases in which there is no blueness, no hæmorrhages and no pulmonary involvement; (*ii.*) severe, uncomplicated cases, in which there is blueness but no pulmonary involvement; and (*iii.*) severe complicated cases in which there is blueness and pulmonary involvement. The questions we wish to address to medical practitioners are:—

(*a*) How many cases of each type of influenza have you observed?

(*b*) What was the type of the first case in each household?

(*c*) What was the type of illness in those who were infected from the first case?

To illustrate what is sought in connexion with this question, the following suppositious cases are given:—

> Patient A. was attacked with type (i.) on March 1, 1919. There are six members of the household. B. was taken ill with type (i.) on March 4; C. was attacked with type (ii.) on March 6. The remaining members of the household escaped. The source of A.'s infection is unknown.
>
> Patient G. was attacked with type (iii.) on March 1, 1919. There are eight members of the household. H. was attacked on March 4, with type (i.); patient I. was attacked with type (iii.) on March 5, while patient J. was attacked with type (ii.) on March 6. No other case developed up to April 20, 1919.

(*d*) What are the ages of the members of the households in which influenza has occurred? The reply should be given in such a manner that the age of the infected and of the uninfected can be distinguished.

(*e*) Kindly state whether reasonable measures to isolate one or more members of a household have been taken, and whether these measures were effective.

(*f*) Has the type of the infection changed during the course of an illness and if so, what appeared to be the cause of the change?

It is conceivable that a patient may suffer from an illness presenting the characters of a mild, uncomplicated, ordinary influenza, indistinguishable from the illness seen in August and September, 1918, in all parts of the Commonwealth. The patient may leave his bed on the third day or earlier and after a few hours, may become more acutely ill. The symptoms characteristic of type (*iii.*) may then develope. In such a case it would be of importance to ascertain whether there was any blueness or leucopenia in the early, mild stage of the disease.

Assuming that the response to this appeal for information will be generous, we purpose publishing the results tabulated in accordance with the points set out above. In no case will the district in which the patients reside or their identity be disclosed.

SIR WILLIAM CROOKES.

Death has claimed one of the most distinguished of British scientists, Sir William Crookes, in the eighty-sixth year of his age. William Crookes made notable contributions to both physical and chemical branches of knowledge. In 1861 he separated from a seleniferous deposit obtained from a factory for making sulphuric acid in Thuringia a new element, thallium. The powerful green line in the spectrum of this substance has made it familiar to every chemist. The determination of the atomic weight of this substance twelve years later with remarkable accuracy led to widespread recognition of the rare ability of Crookes as a chemist. Some difficulties in the final weighings in this investigation induced Crookes to study the perplexing phenomena of rarefied gases. These studies produced the radiometer, that windmill driven by light. Following the same path, he discovered more remarkable properties in rarefied gases, culminating in the brilliant series of researches upon cathode rays. To him we owe much of our knowledge of radiant matter. He showed how the cathode rays dart in a straight line from the negative pole, whatever may be the position of the positive electrode, how the shadow is cast when the rays are intercepted by solid matter, how the rays are deflected by a neighbouring magnet, how phosphorescence is excited in calcium sulphide and how heat is produced when the motion is arrested. In 1881 there appeared a classical monograph on the spectroscopy of radiant matter. The application of these new methods of study to the group of elements known as the rare earths was followed by the discovery of a new element, victorium. For some years he devoted much attention to the study of the origin and property of diamonds. He was given unique opportunities to visit De Beer's diamond mines and to examine the famous blue clay. Many papers and a most fascinating book record the results of his investigations of these precious stones. In 1900 he effected the separation from uranium, by two distinct chemical methods, of the transformation product called uranium X. In 1903 he discovered that the alpha rays from radium induced phosphorescence on a target of crystalline zinc sulphide. The popular "spintharoscope" constituted perhaps the most direct proof of the discontinuous structure of matter to the laity. In 1913 he presented to the Royal Society of London the results of studies, commenced in March, 1909, on the effects of adding various metallic oxides to the constituents of glass in order to cut off the invisible rays of the infra-red end of the spectrum. These studies led to the introduction of various eye-preserving glasses for spectacles. During his lifetime Sir William Crookes received many honours. In 1875 the Royal Society awarded him a Royal Medal, in 1888 a Davy Medal and in 1904 a Copley Medal. On the occasion of the Diamond Jubilee of the late Queen Victoria he was made a Knight Bachelor. In 1910 he was granted the Order of Merit. No Englishman has shown greater ingenuity in devising experiments for advancing physical and chemical knowledge in some of the most difficult branches of these sciences.

Hospitals.

MELBOURNE HOSPITAL.

The Committee of Management of the Melbourne Hospital has issued the usual pamphlet containing the annual report for the year ending June 30, 1918, together with some statistical tables, lists of subscribers and analagous information.

Income and Expenditure.

During the twelve months under review the expenditure exceeded the income by the sum of £39. The Hospital has cost £48,166 to maintain. In 1913-1914 the ordinary expenditure amounted to £36,461. Two years later the expenditure reached over £51,000, while in the year 1916-1917 it receded to just under £43,000. It is stated that the increase in expenditure was largely due to the enforcement of the award of the Wages Board. The price of drugs, dressings, instruments and domestic supplies have also advanced very considerably. In 1915-1916 the amount spent on the surgery and dispensary, presumably in anticipation of a shortage and the consequent increase in price of many drugs, apparently accounted for the reduction in expenditure in the year following. The stocks laid in at that time have by now been exhausted and it is anticipated that this item will present an increasingly difficult task for the treasurers. If due allowance be made for the purchase of a reserve stock of drugs in 1915, it will be seen that the expenditure had increased steadily, year by year.

In regard to the income, the sum of £17,475 was provided by the Government out of a total of £48,129. The Committee of Management deplores that a promise given by the Honourable Sir Alexander Peacock, when Treasurer of Victoria, to increase the size of the grant, has been rendered nugatory by the action of his successor in introducing an all-round reduction in the charitable grants. Private charity, entertainments, etc., yielded £11,791, while the patients were responsible for £10,479. The contributions by the patients are greatly in excess of those of previous years.

The New Hospital Buildings.

The Committee announce with gratification that the cost of building the new hospital has now been fully met. The total amount involved was £286,813. The Trustees of the Edward Wilson estate rendered this undertaking possible by a munificent donation of £100,000. They have recently taken over at their face value the debentures which have been raised for the purpose and have given a further sum of £1,607 to close the account.

The Work of the Hospital.

In his report, Dr. R. P. McMeekin, the Medical Superintendent, points out that serious difficulty was encountered during the course of the year, owing to the shortage of resident medical officers. It was even necessary at one time to engage the services of senior students, but later a sufficient number of medical practitioners became available to conduct the work of the Hospital. The total number of patients admitted to the wards was 6,320. There were 326 patients in the wards at the beginning of the period and 366 at its termination. It is remarked that 136 patients were admitted more than once during the year. In the statistical returns the number of admissions and not the number of persons is recorded. No information is given as to how many of these persons were admitted for the same illness on the second occasion as on the first, and how many were re-admitted on account of an independent affection. Calculating on the basis that all the patients were re-admitted for some independent condition, thus justifying the references to cases of illness, the total mortality would work out at 13.21%. On the other hand, if all the patients had been re-admitted for the same illness, the mortality would be equal to 13.48%. The statement included in the return of a mortality of 12.5% is unjustified, since it is based on the relation of a number of deaths to the sum of the number of patients in the Hospital at the beginning of the year and the number of those admitted during the year.

The average number of patients in the Hospital was 357 and the average duration of stay was 19.6 days. It is stated that the average cost per in-patient was £6 10s. 8d.. It will be seen that the cost of maintaining one patient per day on the figures given amounted to 7s. 4¾d., and if this sum be multiplied by the average number of days of residence, the cost per patient works out at £7 4s. 11.89d..

The total number of operations amounted to 3,452. There were 140 deaths, which is equal to approximately an operation mortality of 4%. The mortality in many of the groups was undoubtedly low.

On the medical side of the Hospital the variety of diseases treated indicates to us that it would have been greatly to the advantage of the medical profession, had many of them been reported in this journal. We trust that this valuable accumulation of knowledge will be distributed in future to the whole medical profession.

It is interesting to note that in the year 1848 the number of patients treated in the Hospital was 89. In the years that followed the activity of the Hospital increased rapidly. In 1852 no less than 1,423 patients were admitted, while five years later the 2,000 mark was reached. Three thousand in-patients were treated in 1869 and over 4,000 in 1888. From 1897 to 1907 the number varied around 5,000, while in 1909-1910 it reached 6,000. The highest number ever admitted was 6,922 in 1911-1912. In a similar manner the number of out-patients has tended upwards from the foundation of the Hospital to the present day. The increase has been somewhat less steady, presumably because the numbers are not governed as closely as are those of in-patients by the amount of accommodation provided. The maximum number was 31,103 in 1915-1916, while in the year under review it was 29,938.

The Medical Staff.

The Committee register their sympathy with the relatives and friends of the following former members of the medical staff who had died during the year while on active service: Major W. S. Garnett, Major J. J. Nicholas, Major N. T. Bullen, Major C. A. Stewart and Captain E. J. Kerr.

Mr. Fred D. Bird, C.B., returned to the Hospital after three years' absence with the Australian Imperial Force. In May, 1918, he resigned his position as honorary surgeon and was appointed consulting surgeon. In September, 1917, Dr. E. H. Embley resigned his appointment as honorary anæsthetist on account of ill health. He was subsequently elected consulting anæsthetist. Dr. R. W. Hornabrook was appointed in his stead. In May, 1918, Dr. F. C. F. Andrew was elected as second medical officer to the Department for Diseases of the Ear, Nose and Throat. Dr. H. H. Turnbull and Dr. C. V. Mackay, although absent on military service, were appointed physicians to out-patients in succession to Dr. R. H. Strong and Dr. J. F. Wilkinson. Dr. Basil Kilvington was appointed honorary surgeon in succession to Mr. Bird. A number of other additions to the medical staff are appended.

The possibility of a person of marked mental deficiency enlisting for active service with the Australian Imperial Force has been demonstrated in a case which engaged the attention of the Criminal Court, Perth, during two sessions and which was finally disposed of on April 1, 1919. It appears that the man in question had been recognized to be mentally deficient during the whole of his life. He offered his services in 1916 and, strange to relate, he was not only accepted and sent abroad, but actually attained the rank of lance corporal. He was discharged from the army in March, 1918, on account of his mental deficiency. He came into conflict with the law in October, 1918, as a result of a sexual offence. His mental condition was studied by Dr. J. T. Anderson, Inspector-General of Insane, and Dr. H. H. F. Martell. Their evidence was to the effect that the man was incapable of pleading and incapable of understanding the court proceedings. An order for his detention at the Hospital for the Insane was consequently made.

Naval and Military.

CASUALTIES.

The 463rd list of casualties, which was issued to the public on April 16, 1919, contains the names of two medical officers of the Australian Army Medical Corps among those reported to be ill. They are Captain Charles Herbert Leopold Leedman, M.C. and Bar (previously reported wounded), and Captain William Abel James.

APPOINTMENTS.

The following appointments, etc., have been announced in the *Commonwealth of Australia Gazette*, No. 46, of April 17, 1919, and No. 47, of April 24, 1919:—

Naval Forces of the Commonwealth.

PERMANENT NAVAL FORCES OF THE COMMONWEALTH (SEA-GOING FORCES).

Transfer to the Emergency List—

Temporary Surgeon George Wade Sinclair, B.A., M.B., Ch.M., is transferred to the Emergency List of Retired Officers. Dated 21st April, 1919. (This cancels that portion of Executive Minute No. 17/1919, notice of which appeared on page 346 of the *Commonwealth Gazette*, No. 28, of 27th February, 1919, relating to the termination of appointment of Temporary Surgeon George Wade Sinclair at own request.)

Payment to Officers Temporarily Acting in Higher Rank—

Surgeon-Lieutenant Vivian Ramsay-Smith is to be paid rates of pay prescribed for Surgeon-Lieutenant-Commander (on appointment) whilst temporarily acting in that rank, to date 1st April, 1919.

Australian Imperial Force.

Second Military District.

Major (Temporary Colonel) E. W. Fairfax, Australian Army Medical Corps, relinquished temporary rank of Colonel on relinquishing appointment of Consulting Physician, 5th Army. Dated 29th December, 1918.

APPOINTMENTS TERMINATED.

First Military District.

Captain J. C. Browne. Dated 23rd May, 1919.
Lieutenant-Colonel A. M. McIntosh. Dated 7th April, 1919.
Captain S. E. Wilcox. Dated 15th April, 1919.

Second Military District.

Major R. I. Furber, D.S.O.. Dated 1st May, 1919.
Captain W. R. C. Beeston. Dated 29th March, 1919.
Captain W. R. Beavis. Dated 6th April, 1919.
Captain H. V. D. Baret. Dated 15th March, 1919.
Captain A. D. Forbes. Dated 30th March, 1919.

Third Military District.

Captain T. S. Campbell. Dated 25th March, 1919.
Captain F. F. A. L. Lemon. Dated 20th March, 1919.
Captain A. W. Nankervis. Dated 26th February, 1919.

Fourth Military District.

Major E. A. Brummitt. Dated 13th April, 1919.

Fifth Military District.

Captain B. F. Hussey. Dated 5th March, 1919.
Captain W. E. Blackall. Dated 15th February, 1919.

Sixth Military District.

Captain J. H. R. McCutcheon. Dated 16th March, 1919.

Australian Naval and Military Expeditionary Force.

To be Captains, Army Medical Corps—

Hugh Hedley Skeoch. Dated 6th March, 1919.
Captain W. R. Beavis. Dated 7th April, 1919.

Australian Military Forces.

First Military District.

Australian Army Medical Corps Reserve—

The resignation of Honorary Captain A. S. Roe of his commission is accepted. Dated 28th February, 1919.

Second Military District.

Australian Army Medical Corps Reserve—

Arthur McAfee Burge to be Honorary Captain. Dated 16th March, 1919.

Third Military District.

Australian Army Medical Corps—

Major (temporary Lieutenant-Colonel) W. B. Vance to relinquish the temporary rank of Lieutenant-Colonel on vacating the appointment of Officer Commanding No. 11 Australian General Hospital. Dated 28th February, 1919.

Australian Army Medical Corps Reserve—

The resignation of Honorary Captain C. F. Tucker of his commission is accepted. Dated 1st March, 1919.

Sixth Military District.

Australian Army Medical Corps Reserve—

Honorary Captain C. H. Smith-Hozier to be granted the temporary rank and pay of Major whilst employed as Member of Permanent Medical Referee Board, from 10th February, 1919, to 17th February, 1919.

Abstracts from Current Medical Literature.

OPHTHALMOLOGY.

(156) Ring Infiltration of the Cornea.

D. V. Giri reports a case of ring infiltration of the cornea following purpura and discusses the subject of corneal infiltrations (*Brit. Journ. of Ophthalm.*, December, 1918). Ring infiltration of the cornea, or ring abscess, is a rather uncommon affection, resulting from a perforating wound of the globe, operative or otherwise, or by metastasis from some septic, general or local disease. Twenty cases have been recorded. A boy, aged 13, was seen a week after the onset of an illness characterized by headache, vomiting and diarrhœa, spots on the body and severe pain in the right eye. The eye was injected, the pupil small and inactive and filled by exudate. There was a yellowish-grey ring of infiltration of the cornea 2 mm. from the limbus. Next day the infiltration extended all over the cornea, but was densest in the ring. A week later the ring was resolving and the rest of the cornea clear. A month later, as the eye was soft and blind and irritable, it was removed. The retina was detached and there was a patch of exudate behind the lens. The purpura was the form known as Henoch's purpura, and the affection of the eye was a local manifestation of the general disease of the blood. The ring infiltration formed rapidly, being complete within 48 hours of the onset of the eye trouble. Contrary to the rule, it retrogressed instead of going on to panophthalmitis. Fuchs first described the condition in 1881 after a cataract extraction. According to Leber, white blood corpuscles migrate from the vessels at the corneal margin and make their way towards the microbic area, without, however, quite reaching it, as it offers a resistance to their further advance. Thus a ring is formed. The infiltration travels not to the wound nor to the necrotic cornea, but to the toxin-pervaded area of the cornea, that is, the whole cornea. Hence its annular shape and constant position, wherever the wound may be situated. How soon the whole cornea becomes permeated by the toxin depends upon the rapidity of output of the toxin and its power of diffusing. This is accelerated by the toxin entering the anterior chamber and acting through the aqueous on the cornea from behind. *Ulcus serpens*, on the other hand, originates in superficial injuries of the cornea, spreads slowly from the centre to the periphery, and necrosis proceeds from the anterior side of the cornea. The anterior chamber is germ-free. In interstitial keratitis of syphilitic origin the toxins are, as a rule, of low virulence, so that leucocytes find no insurmountable obstacle to their advance; hence the infiltration is slow and diffuse. In *keratitis disciformis*, characterized by a disc-shaped cloudiness in the middle layers of the cornea, with a more strongly clouded spot in the centre, the course of the disease is prolonged and does not lead to destruction of the cornea. It is doubtful if the cloudiness is due to leucocyte infiltration at all.

(157) Formation of Clear Spaces in Corneal Nebulæ.

W. T. Holmes Spicer describes in detail the formation of clear lines in old corneal scars (*British Journ. of Ophthalm.*, January, 1919). They occur in two forms, geometrical figures and the mushroom cap. The geometrical lines appear in the midst of the nebula and form various patterns. They are mostly confined to the centre of the cornea, but sometimes reach the limbus. They have as their basis the tracks of old vessels; these, from compression in the layers of the cornea, become flattened, widened and stretched. The condition most commonly follows interstitial keratitis. The mushroom cap has the appearance of a section of a mushroom head and stalk. The stalk is of a blue-grey colour and generally reaches the edge of the cornea. The head of the mushroom is crescentic in shape, dirty white in colour, partially or completely surrounding the stalk. Between the head and the stalk is an interval of clear cornea. Several systems of stalk and head may be seen together in the cornea. They are not the scars of ulcers themselves, but appear after an ulcer has healed. They are apt to follow the fascicular or leash ulcer and may occur after scleritis at the corneal margin.

(158) Factors in Stereoscopic Vision.

Stereoscopic vision — literally solid vision—has been commonly accepted as a specific visual function, the result of fusion of dissimilar images formed on the two retinæ. E. M. Eaton considers that, apart from the fusion sense, there are five factors of first importance whereby we perceive solidity through vision (*British Journ. of Ophthalm.*, February, 1919). The chief of these is the sense of perspective—the shape of the retinal images of objects of whose real shape we have some other means of gauging. Other factors are alteration of definition according to distance, lighting effects, sense of convergence in very near objects and parallax. Of lesser value are atmospheric interference, accidental occurrences and the muscle sense. It is generally accepted that a one-eyed man sees stereoscopically; at first he makes mistakes, but soon learns efficiency. The fusion sense is not an essential or dominating factor; it is subject to many limitations. Geometrically, it is obvious that in any plane surface the images of only those points very close to the fixation point fall on corresponding points of the two retinæ. Theoretical accuracy demands that the surfaces of reference should be circular, the circle passing through the fixation point and the nodal points of the two eyes, known as the horopter. The minimum visual angle being one minute, appreciable dissimilarity of images in the two eyes occurs up to 110 metres; beyond this distance the fusion sense can play no part. The perspective sense is not limited by distance; its accuracy depends on form sense and form memory. It is not so easily deceived as the fusion sense. The relative apparent movements of objects in different planes when the observer moves his position (parallax) is a legitimate factor in stereoscopic vision. The parallax presented by a travelling train is an unmistakable evidence of varying depth.

(159) Successful Use of Radium in Orbital Tumour.

At a meeting of the Ophthalmological Section of the New York Academy of Medicine Geo. H. Bell showed a case of orbital tumour of large extent, which had been treated with radium (*Knapp's Archives*, September, 1910). The original X-ray plate showed the orbit filled by a large growth, which extended over the brow. The area externally involved was treated with a radium instrument 1.2 by 0.5 cm. in area in six places, leaving intervals of 3.75 cm. untreated between each. Only the very penetrating rays were employed, with the expectation of every part of the tumour being affected equally. Twenty milligrammes of radium salt (radio-activity 2 millions = 20 millicuries) were used, one application of an hour to any single area. At first the applications were weekly. In two weeks there was diminution of size, and this continued progressively. The treatment was begun on December 19, 1917, and ended on April 1, 1918. Two months later not a trace of the tumour remained, and the patient seemed perfectly well. The patient's (untreated) appearance was described as a ghastly spectacle.

(160) Cataract Extraction in the Capsule.

Instead of forcibly expressing the lens by pressure on the cornea, J. A. Kearney prefers to rupture the zonule of Zinn with the cystotome (*Arch. Ophthalm.*, January, 1919). After the usual incision and iridectomy the conjunctiva is fixed below and in with forceps and the cystotome is introduced, blade flat, at the outer end of the incision, passed behind the iris and engaged in the suspensory ligament below. A quick, jerky movement is then executed circularly inwards and upwards. The lens is then easily expressed in its capsule. This happened thirteen times out of fifteen consecutive extractions without loss of vitreous.

(161) Surgery of Meibomian Cysts.

To promote rapid healing and a satisfactory result after opening a meibomian cyst, John Dunn is convinced that it is of first importance to make the incision along the gland to and through its opening on the free border of the lids (*Arch. of Ophthalm.*, January, 1919). He anæsthetizes the part by injection of a 1% solution of novocaine beneath the skin of the lid, as well as instilling drops of a 10% solution of cocaine on the conjunctiva. He uses a special curette and swabs the surface with silver nitrate solution (1 grm. to 30 c.cm.).

LARYNGOLOGY AND OTOLOGY.

(162) Early Diagnosis of Intra-Laryngeal Carcinoma.

In the September, 1918, number of the *New York State Journal of Medicine*, D. Bryson Delavan discusses the early diagnosis of intra-laryngeal carcinoma. Intrinsic cancer of the larynx, he says, is generally primary, arising usually from one of the vocal cords or its vicinity, notably the *sacculus laryngis*. Hoarseness often precedes other symptoms and is generally accompanied by a little hyperæmia in or near one vocal band, but cough is not usual. Next, a local lesion is likely to manifest itself. If below the vocal bands, it may be impossible to demonstrate it by laryngoscopy until long after it has established itself, but if on a vocal cord, or arising from the *sacculus laryngis* or ary-epiglottic folds, it is, as a rule, readily visible. Blanching the parts with adrenalin may facilitate its exposure. It may be seen as a distinctly localized, white or greyish-pink, superficial, warty excrescence, often surrounded by a narrow red zone of inflammation or it may appear as a deep, fairly localized growth, with reddened irregular or nodular surface or again beginning indefinitely it may extend as a diffuse infiltration of the ventricular bands. Pain, of a peculiar pricking character, of sudden onset, quickly dying away and distinctly originating at the site of the growth, is often one of the earliest signs. It is not to be confused with the lancinating pain, radiating to the pharynx and ears, which appears late in the history of the case, nor with the dysphasia caused by an extension of the ulceration. Pressure on the affected larynx will often cause pain. Muscular infiltration in the neighbourhood of the neoplasm may set in at varying periods after the establishment of the growth, resulting in a steadily increasing interference with the movements of the larynx. This is a valuable diagnostic sign. Glandular involvement, dysphagia, dyspnœa and cachexia are late symptoms. Intra-laryngeal carcinoma is unusual before 40 years of age, but the tendency to its development increases rapidly with advancing years. About 90% of all cases occur in males. The immoderate use of alcohol and tobacco, the existence of tertiary syphilis in the larynx and chronic laryngitis are believed to be predisposing factors. Syphilis, tuberculosis, gout, lupus, benign growths, *pachydermia laryngis*, chronic laryngitis, perichondritis and laryngeal paralyses may all simulate laryngeal cancer. Hoarseness, associated with congestion or tumefaction of one vocal band may be suggestive of syphilis, tuberculosis or gout and, after middle age, of malignant disease. Ordinary laryngitis is generally bilateral. Benign growths are often difficult to differentiate. *Pachydermia laryngis* can frequently be diagnosed only with the lapse of time. Primary lupus of the larynx is rare, its existence in other parts would assist in its identification. Simple laryngitis, perichondritis and paralysis from non-malignant causes can generally be recognized. A warty growth on the vocal or ventricular bands may resemble a benign papilloma, but appearing late in life, a unilateral growth is to be regarded with suspicion, especially if fixed and infiltrating subjacent structures, if of whitish colour and attended with pain, if associated with impairment of cord movement or if on the posterior third of the vocal cord or in the posterior commissure. A ventricular growth may overhang the vocal cords without impairing their movements. A growth on the epiglottis or the ventricular bands may resemble a gumma, but the latter developes early, ulcerates rapidly, is painful and reacts to potassium iodide. Ulcerating perichondritis is often difficult to distinguish from a tertiary lesion and a breaking-down malignant growth. The exhibition of iodides will assist in the differentiation. Tuberculosis of the larynx is generally accompanied by signs in the chest, but when primary, the diagnosis may be made by means of cultures from laryngeal secretion or by the tuberculin test. It may co-exist with laryngeal carcinoma, syphilis, or both. The question will generally lie between carcinoma and syphilis. The laryngoscopic appearances are often quite inconclusive. Here potassium iodide is a most valuable resource, though its administration may cause improvement in either case. The author holds that intra-laryngeal removal of fragments of suspected malignant tissue for microscopical examination is to be deprecated, as it often leads to the rapid degeneration and extension of the growth. He strongly advocates thyrotomy in doubtful cases. The larynx is opened, the growth examined, a portion, including its base, removed, immediate microscopical examination made of frozen sections, and, if found malignant, the growth is at once extirpated.

(163) Escape of Cerebro-Spinal Fluid From the Ear.

J. F. O'Malley reports a case in which cerebro-spinal fluid escaped in large quantities from the ear during a period of twelve months (as much as seven litres in three months), without any apparent injury to health (*Journ. Laryng., Rhin., Otology*, August, 1918). The patient, a soldier, aged 27, had had a mastoid operation performed 10½ years previously. Six years later and three times, at intervals, afterwards, polypi were removed from the affected ear. Soon after the last removal, 18 months previously, the ear began to drip and, on examination twelve months later, there was found a free flow of cerebro-spinal fluid from the external meatus, the latter being almost completely blocked by a small cyst-like swelling, which was found to be the scar-tissue of the mastoid raised by the exuding fluid. Pus was also present. The patient suffered from a languid feeling and headache. The scar-tissue was removed and the cavity well cleaned and packed with gauze soaked in iodoform emulsion, but the wound continued bathed in pus. The cavity was then treated daily for six weeks with loose packings of sterile gauze wrung out of a solution of 40% *spir. vin. rect.*. The wound, being then fairly clean, was dusted with boric powder and firmly packed with sterile gauze daily. The escape of fluid gradually diminished. Four months after the operation the leakage ceased and by this date the mastoid wound and middle-ear cavity had healed, the patient felt well and returned to light duty. The point from which the fluid escaped was found to be in the posterior part of the attic near the aditus. The author calls attention to the influence of the cerebro-spinal fluid in producing profuse suppuration in the mastoid cavity after operation. He deprecates the employment of firm packing to arrest the escape of the fluid, until there is a good covering of granulation tissue as a protection against infection of the meninges.

(164) Total Laryngectomy.

The use of local anæsthesia (in thirteen out of fifteen cases) and the performance of tracheotomy two weeks before the operation (in each case) are considered by R. J. Moure (*Bull. de l'Acad. de Méd. de Paris*, May 8, 1917) to have been important factors in his success (100% of recoveries) in laryngectomy. With patulous larynges and the growth still confined within the larynx, extirpation from above downwards is recommended by the author, but where the epiglottis and its lateral folds have become involved extirpation from below upwards is preferable. A large cannula is used in the trachea, with a thick tampon of iodoform gauze above it during the operation, to keep the blood out of the trachea. Wounds in the soft tissue are evened off, to obviate post-operative sloughing, and iodoform tampons placed above the cannula in the trachea and in the region of the œsophageal entrance, before suturing layer by layer the œsophagus, the prelaryngeal layers and skin. A permanent œsophageal tube and a Lombard cannula facilitate the dressings for the first few days after operation. Two or three dressings daily, commencing on the second day, are recommended.

(165) Laryngeal Tuberculosis.

It is maintained by H. Arrowsmith (*New York Med. Journ.*, August 11, 1917) that laryngeal tubercular lesions originate almost invariably from surface contamination. He affirms that tubercle bacilli can penetrate intact mucous membranes, and thus that infiltration without erosion can occur. He advises amputation of the epiglottis (an operation causing little reaction) for the immediate relief of dysphagia and odynophagia in the absence of ulcerative conditions elsewhere. The galvanocautery in superficial ulceration under direct exposure gives excellent results. Deep ulceration should be thoroughly curetted and cauterized. Deep puncture with a fine cautery is effective in infiltrated areas and abscesses with perichrondritis. Suspension, with carefully planned surgical measures, will cure slighter and ameliorate severer cases.

British Medical Association News.

MEDICO-POLITICAL.

A meeting of the Queensland Branch was held at the B.M.A. Rooms, Adelaide Street, Brisbane, on April 4, 1919, Dr. A. Sutton, the President, in the chair.

Dr. C. A. Thelander moved:—

(*i.*) That this meeting point out to the Government that the present system of appointments to the honorary staffs at the General Hospital is unsatisfactory and in the interests of the public urgently demands alteration.

(*ii.*) That this meeting represent to the Government the urgent desirability of all such appointments being made on the recommendation of an advisory board, comprised of representatives of the Queensland Branch of the British Medical Association and of the University staff.

Dr. C. S. Hawkes seconded the motions. The questions were discussed by Dr. W. F. Taylor, Dr. R. Graham Brown and Dr. J. Thomson and were carried.

Dr. C. S. Hawkes moved and Dr. C. A. Thelander seconded:

That the Council of the Queensland Branch be requested to appoint a sub-committee, or as a whole, to formulate a scheme by which appointments should be made, the scheme to be submitted to a general meeting of the Branch before being presented to the Government.

The motion was carried.

REPORT OF THE SOUTH AFRICAN INFLUENZA COMMISSION.

On December 3, 1918, a Commission was appointed by the Governor-General of the Union of South Africa to enquire into and report upon:—

(a) The circumstances attending the commencement of the recent epidemic of influenza in the Union of South Africa;

(b) the incidence and spread of the disease;

(c) the measures taken to combat it;

(d) the measures recommended to be taken to safeguard against or deal with any similar outbreak in future, and

(e) any other matters connected with the epidemic which may come to the notice of the Commission during the course of its enquiries.

The Commission sat at Pretoria, Johannesburg, Durban, Pietermaritzburg, East London, Bloemfontein, Kimberley and Cape Town, between the dates of December 6, 1918, and February 4, 1919. In addition to the statements submitted by persons who did not appear, evidence was taken of 192 witnesses. The following is the summary of the report.

(a) The Origin of the Epidemic.

The Commissioners were satisfied with the expert evidence revealing that the disease known as Spanish influenza or epidemic influenza is identical with the epidemic prevalent in practically every country in the world and further that the disease has no connexion whatsoever with pneumonic, bubonic or septicæmic plague. The Commission was further of opinion that there is some reasonable doubt as to whether the *Bacillus influenzæ* or any of the other organisms so far found associated with cases of epidemic influenza, are the true causative agents of the disease. It is held by certain authorities that an ultra-microscopic virus may be the causative agent. The Committee regretted that the circumstances in the early stages of the epidemic were such that careful investigations into the ætiology of the disease were not carried out and suggested on December 19, 1918, that the Government should take steps to institute further research work, with a view to discovering the causative organism. The Commission urged strongly that no time should be lost in pursuing these investigations while the material was still obtainable.

In the following paragraphs the prevalence of the disease in Sierra Leone and its introduction into South Africa are dealt with in considerable detail. Information is given concerning the movements of ships from an infected port and of ships with infection on board. It is stated that the earliest date that could be fixed for an outbreak of influenza in the Union of South Africa was September 14, 1918. The place first affected was Durban. The first case appeared at Kimberley nine days later and within two or three weeks the disease became pandemic. It appears, however, that prior to October, 1918, epidemic influenza of a mild type was widely prevalent in Europe. Nothing was attempted by the various Governments to prevent the spread of the disease or to organize communities against a possible outbreak. The Commission regretted that no concerted international action had been taken at an early date and they expressed the hope that one of the results of the epidemic would be the establishment of an international organization for the rapid dissemination of authoritative information regarding epidemics. They held the opinion that pending the inauguration of such an international organization, the Health Department of the Union should obtain as full information as possible concerning the outbreak of epidemic diseases in other parts of the world.

The cabled messages which passed between the Government of the Union of South Africa and the Government of the Commonwealth of Australia are reproduced. The Commission expressed the opinion that the weight of expert evidence was so decidedly against the effectiveness of maritime quarantine in a disease of the nature of epidemic influenza that, although giving full credit to the experience of Australia, the Commission was not prepared to state that maritime quarantine should have been enforced. They did not think that even the timely enforcement of maritime quarantine would necessarily have prevented the outbreak in South Africa.

(b) The Incidence and Spread of the Disease.

The Commission recognized that it was impossible to obtain reliable statistical information in regard to the attack rate of the disease. In an appendix the following figures *inter alia* are given:—

The total population of the Union was 6,115,212, of which 1,418,060 were Europeans. The total number of persons affected was 2,616,805, including 454,653 Europeans and 2,162,152 others. These figures give an incidence rate of 32.06% among Europeans and 46.03% among other than Europeans. The total number of deaths, which the Commission held to a much more reliable figure, was 103,471, including 11,726 Europeans and 127,745 other than Europeans. On the assumption that the incidence figures are correct, the case mortality among Europeans was 2.57% and among the others 5.9%. The death-rate per 1,000 of population was 8.26 among the Europeans and 27.19 among the others. The Commission pointed out that in Natal the death-rate was much lower than in the Cape, the Transvaal or the Orange Free State. The death-rate per 1,000 of population among the Europeans in Natal was 2.99, as compared with 12.34 in the Orange Free State, 9.48 in the Cape and 6.55 in the Transvaal. No adequate explanation is offered for this extraordinary variation. It is recorded that in the epidemic of influenza of 1889-1890 Natal suffered less than other parts of the country. The Commissioners pointed out that a similar variation had been observed during the 1889-1890 epidemic in various parts of England. In referring to the susceptibility of the native and coloured population of South Africa to diseases of the respiratory tract, they found that unhygienic housing, the lack of even the most rudimentary knowledge of caring for the sick, the prejudice against medical help and the disinclination to enter a hospital undoubtedly played an important part in causing the heavy mortality. There was evidence to show that persons in the third and fourth decades of life were particularly susceptible to the disease and that the mortality was greater in these age groups. Children and old persons seemed to be more or less immune. Europeans born in South Africa seemed to be more susceptible than European immigrants. They noted the liability of pregnant women to abort, the fatal effect of the disease on the fœtus *in utero* and the high mortality rate among pregnant women.

The Commission found no evidence that influenza was an air-borne disease and they saw no reason to question the validity of the theory that influenza is spread by contact only. The general trend of the evidence submitted was that the spread of the disease was facilitated and accelerated by the railways.

(c) Measures Taken to Combat the Epidemic.

On September 13, 1918, the s.s. *Jaroslav* arrived at Cape Town from England *viâ* Sierra Leone. Among the troops on board there were three individuals suffering from tuberculosis and 19 from influenza. All the healthy troops were removed to Rosebank Depôt, but between the 13th and 17th of the month six cases developed among the troops, while 30 natives out of a total of 84 employed on the permanent staff also became infected. The troops were discharged to their homes on September 16 or 17. Similar precautions were taken in the case of the troops on board the s.s. *Veronej*, which arrived from Sierra Leone in Table Bay on September 18, 1918. Every means were taken to prevent infected persons from mixing with the general community. On October 8, 1918, the magistrates throughout the Union were requested to engage medical and nursing assistance. On the following day the Government intimated that it would bear half the cost incurred in the application of reasonable measures aiming at the checking of the epidemic. On October 10, 1918, a public notice was issued by the Department of Public Health, calling attention to the fact that influenza was one of the most infectious and rapidly spreading diseases known. (This opinion, however, has been challenged in Australia.) The Department further pointed out that it is spread chiefly by close contact with the sick and that the congregation of persons indoors favours its spread. Infection is rapidly destroyed by sunlight and fresh air, so that there is very little risk of infection out of doors. The period between the infection and the first symptoms is usually about two days. The onset is, as a rule, extremely sudden, with fever, severe pains in the head, back and limbs, catarrh, weakness of the legs and increasing prostration. The duration of illness is usually three or four days and recovery is rapid unless chest complications follow. The Department notified that in the majority of cases the patients could be treated at home and should go to bed at once and remain there until recovery was complete. They recommended an initial purge and in severe cases small doses of stimulants every two or three hours. They stated that there is no specific cure for the disease. Quinine in small doses, acetyl-salicylic acid and similar drugs are useful. Persons who have had the disease should be selected to attend the sick. Sputum should be burnt and soiled linen boiled.

While the Department held the opinion that isolation could not be relied to prevent or eradicate the disease, they stated that it might be useful in limiting its spread. A paragraph is devoted to the arrangements made by the Department and the local authorities for dealing with the disease locally. In the final paragraph of the notice medical practitioners are informed that the Acting Director of the South African Institute for Medical Research had reported that investigation of a number of cases showed that the disease was due to the influenza bacillus, other organisms, including pneumococci, being generally present in fatal cases.

A day or two before the issue of the notice, a polyvalent vaccine was issued by the Government Laboratory. A memorandum was prepared by the Department of Public Health and issued with the vaccine. In this memorandum it is set forth that the Director of the South African Institute for Medical Research has stated that he was unaware that the use of a vaccine had been authoritatively recommended in any epidemic of influenza in any country in the world. He knew of no epidemic of influenza that had been successfully combated by the use of vaccine. He had called attention to the great difficulty experienced in immunizing animals against Pfeiffer's bacillus and he stated that there was no reason to suppose that human beings were more amenable to artificial protection against the disease. There was a very slight evanescent protection conferred by an attack. The Director added that the problem had not been solved and that it was entirely unjustifiable to claim that any bacterial vaccine conferred any protection whatever against epidemic influenza. He thought, however, that adequate doses of a comprehensive (Lister's 8-group) pneumococcal vaccine might possibly be useful in preventing pneumonic complications and be of service when such had arisen. It is further set out in the memorandum that the Assistant Medical Officer of Health for the Union and the Government Bacteriologist had stated that the results of the use of a mixed vaccine (*B. influenzæ*, *Pneumococcus mucosus*, *Micrococcus catarrhalis* and Friedländer's pneumobacillus) were encouraging, especially as regards the prevention of secondary pneumonia and the reduction of mortality.

Medical practitioners and medical officers of health were requested to communicate the results of their experience with vaccines to the Department.

All the available resources of the South African Institute for Medical Research were utilized for the preparation of vaccine. Throughout October and November 104 medical men, 227 nurses and 163 students, hospitals' orderlies and inoculators were engaged by the Union Health Department and sent to certain localities. An arrangement was entered into between the Health Department and the Defence Department whereby hospital equipment, medical officers, nurses and orderlies were placed at the disposal of the former. The Miners' Phthisis Bureau was closed down and the staff placed at the disposal of various local authorities. Medicine and appliances were supplied to numerous local authorities. Instructions were issued to all Government Departments to make available all *personnel* except those who were absolutely essential work, to assist in combating the disease. The aid of the Defence Rifle Association was also obtained.

On October 14, 1918, the disease was proclaimed a contagious or infectious disease in terms of the various acts applicable in the several provinces. This gave the local authorities power to remove or isolate persons suffering or suspected to be suffering from the disease or persons exposed to infection.

The local authorities were further empowered to close theatres, picture shows, etc.. In many instances use was made of this power.

A modified form of quarantine was introduced. In the case of uninfected vessels full pratique was given, while the master and those on board were warned of the danger of infection on shore and a supply of vaccine was furnished. Restricted pratique was given to infected vessels, the Port Health Officer being allowed discretion to modify the restriction to meet special circumstances. All persons on board were medically examined and those found to be, or suspected of being, infected, were removed to an isolation hospital. The healthy persons were allowed to proceed to their destination and the local authority at their place of residence or destination was notified that these persons may have been recently exposed to infection. A supply of vaccine was issued to the master of the ship.

The following paragraph concludes the recital of the measures taken by the Union Government to combat the disease:—

> In view of all the circumstances and of the inadequacy of the Department as it existed at the time, the Commission realizes that it was almost an impossibility to deal with the outbreak at its inception in a more satisfactory manner.
>
> Although nine years have elapsed since Union, no provision has been made for health authorities in rural areas in the Transvaal, Orange Free State, Natal and other portions of the Union. Further, no steps have been taken towards the creation of an efficient central department of health; indeed, the functions of the existing Department have never been properly defined. Unfortunately, South Africa is not alone in this respect. Looking backward, it is now obvious that not only the Union Health Department, but the health departments of most other countries, should have acted on some such lines as the following as soon as it became clear that the epidemic in Spain was of a serious character. The public health department should have, prior to the outbreak of the epidemic or very early in the crisis, called a conference of experts, with a view of consulting as to the best means of preventing the introduction of the disease into the country and for dealing with it in the event of a serious outbreak occurring. No doubt the war diverted the attention of governments and of the public generally from current health work and probably was in a large measure responsible for the fact that nowhere, as far as we have been able to ascertain, was the seriousness of the influenza epidemic realized in time for effective preventive steps to be taken to combat it.

The Commission records that no particularly noteworthy steps to combat the epidemic were taken by the provincial

administration beyond the expansion of hospitals. On the other hand, the local authorities did extremely well, if allowance be made for the financial and other limitations. They provided medical relief, nursing relief, food, burial for the dead, transport and hospital accommodation. Some of the municipalities adopted the extreme expedient of requisitioning essential supplies. This met with general approval. The Commissioners record their opinion that the larger measure of credit in what had been accomplished in fighting the epidemic was due to the generosity and the unselfishness of the citizens.

(d) Recommendations for Future Outbreak.

Although the Commissioners regarded it unlikely that a very serious epidemic of influenza would invade the country again within a short space of time, they urged that measures of preparedness should be taken. The first suggestion is that the Government of the Union of South Africa should enter into negotiations with the Governments of other countries, with a view to the establishment of an international bureau for the collection and dissemination of information bearing on the prevention of limitation of disease. The second recommendation embraces a proposal to widen the scope of the Health Bill, which is now before Parliament, to include many of the provisions suggested in the report. The Commission regarded it as essential that a thoroughly autonomous and efficient health department on modern lines should be established immediately and that the head of this department should be directly responsible to the Minister. The Public Health Department should be in close co-operation with the medical section of the Union Defence Department. The Public Health Department should be a body of experts in the various sub-divisions of public health and hygiene, of such professional standing that the general public and the health officers of the country could confidently look to them for expert advice in every domain of public health. The Medical Officer of Health for the Union should be a man of broad administrative experience and ability and his assistants should be specialists in epidemiology, pathology and bacteriology, tropical medicine, vital statistics, hospital management, maritime quarantine and sanitary engineering. The Commission suggested for the careful consideration of the Government the advisability of combining the offices of Medical Officer of Health for the Union and Director of Medical Services of the Defence Department. They considered that these appointments should be filled by men of high ability and experience in their particular branches and that the record of previous services and achievements in their particular field should be given very much greater weight than mere possession of academic qualifications. The salaries should be made adequate to attract the very best type of men.

It is considered that the system of stationing assistant medical officers of health for the Union in the various provinces was unsound *per se*, but that the specialized staff of the Health Department should be centralized at Pretoria and that there should be travelling field officers.

There should be in the office of the Medical Officer of Health for the Union data and rough outlines of what may be designed "mobilization plans" applicable to various types of communities for combating epidemics.

There should be provided in this Department a strong bureau to deal with the collection and dissemination of information in regard to public health. This bureau should disseminate technical information not only to public health officials, but also periodically to the general public on the lines adopted in the City and State of New York and various other communities. It is suggested that the bureau should utilize agencies such as the Red Cross Socity, the St. John Ambulance Association, etc., for the purposes of educating the public, and especially women and girls, in the principles of hygiene, first aid and home nursing. These subjects should be taught in schools to all girls over the age of 13 and hygiene and first aid to boys over the same age.

The Commission recommended that the Government should have the power to requisition not only supplies and buildings, but also the services of any person in the event of a widespread epidemic threatening great loss of life. Safeguards should be given, however, that the requisition of services should under no circumstances be applied exclusively or primarily to one profession or class of citizen.

The Commission was of opinion that the Government should actively encourage medical research and urged that the routine laboratories under the control of the Government, should be linked up with the South African Institute for Medical Research, in order to promote uniformity of policy and efficiency and to make available material which under the present system was lost through the lack of facilities in the routine laboratories to pursue scientific research.

The Commission was of opinion that the medical department of the University of Cape Town and any other medical school which may be established in the country, should not only be encouraged, but should be required to conduct a certain amount of medical research and that any grant-in-aid should be contingent upon research being carried out. They held that this was very important, not only from the point of view of research, but also in the interest of the teaching efficiency in the medical school.

The Commissioners further recommended that the Onderstepoort Government Veterinary Research Laboratories should collaborate with the South African Institute for Medical Research and that the existing arrangements between the Government and the Witwatersrand Native Labour Association in regard to the financing and control of the South African Institute for Medical Research should be continued. They recommended the appointment of an expert advisory body to advise the Government on all matters connected with medical research.

Suggestions are made in the report to overcome the difficulty of obtaining adequate medical and nursing aid in sparsely populated areas. District surgeons might be appointed on the understanding that their services would be available in any portion of the Union during the time of the epidemic.

They held that the present procedure whereby the poor obtained medical relief, was exceedingly unsatisfactory. It was frequently the case that a man was not a pauper in the true sense of the word and strongly resented being designated in this way, but that his financial position was such that he was not able to pay the very high fees attached to medical attendance in rural areas, on account of the distances medical practitioners had to travel to see their patients. To remedy this state of affairs, the Commission recommended that surgeries should be established in rural communities where district surgeons would attend on stated days. Advice could be given to ambulatory patients at ordinary fees. The magistrates should be given power to authorize the district surgeon to travel at the Government's expense to attend urgent cases of illness in persons who could not afford to pay more than ordinary fees. In addition, permanent hospitals should be provided in rural areas and these hospitals should be made a centre for district nurses.

In the erection of schools and other public buildings, the architect should be required, when practicable, to design the buildings so that they could be converted into hospitals in case of need.

So-called isolation or fever hospitals should be consolidated with general hospitals. The Commission felt that the present system of separate institutions was a relic of mediæval ignorance, productive of inefficiency and waste of public funds. They were convinced that there was no danger whatever of a spread of infection in a general hospital through the patients in an infectious diseases section attached to the institution.

Maritime quarantine should unquestionably be resorted to in preventing the entrance into the Union of certain epidemic diseases. They held it to be uncertain whether quarantine could be usefully employed in a disease of the nature of epidemic influenza.

The Commission was of opinion that the rigorous isolation of patients in the early stages of influenza would have been beneficial, but they fully recognized the difficulty in ascertaining the presence of a few scattered cases of the disease. The local authorities, however, should have power to isolate patients or contacts in such a way as future scientific research might determine to be necessary. They recommended the imposition of certain restrictions to railway travel during the course of an epidemic.

The difficulty of distinguishing ordinary influenza from epidemic influenza rendered it impracticable to include the

latter among the notifiable diseases. General notification of influenza would merely involve the authorities in heavy expediture, without any commensurate results. In the event of an outbreak, however, they suggested that the disease might be made temporarily and locally notifiable. The determination should be left in the hands of the local authorities.

The evidence of bacteriologists and medical practitioners in regard to the utility of the vaccines in use for the prevention and treatment of epidemic influenza, were so controversial that it was impossible for the Commission to make definite recommendations. Certain facts, however, stood out as uncontrovertible. The vaccines, when properly used, caused no ill effects. Many medical practitioners held the opinion that the vaccines did a certain amount of good, although these opinions were not supported by statistical evidence. They therefore expressed the opinion that the issue of vaccines during the epidemic and of the advice referred to above, was justified. The Government should have the power to examine any vaccine, serum or similar product on the market and to forbid the sale of preparations found to be deleterious.

The Commission felt strongly that no public recommendation should be issued by the Government to use vaccines, the utility or harmlessness of which had not been thoroughly and scientifically established.

Further recommendations are contained in the report concerning the special provision of medical and nursing relief in native areas, concerning the collaboration between the railway and shipping authorities and the Health Department during the progress of an epidemic and concerning the general need for improved sanitary arrangements throughout the Union.

Minority Report.

Three of the Commissioners signed a short report, disapproving of the suggestion that the Government should have powers to requisition personal service. The reasons for the dissent are set out in five paragraphs.

Correspondence.

PNEUMO-CATARRHAL DIATHESIS.

Sir,—In reading in the *New Zealand Medical Journal* for February, 1919, a paper by Major Pratt Johnson on the "Pneumo-Catarrhal Diathesis"[1] one comes across the following statements:—

> In six typical clinical cases of acute lobar pneumonia pneumococcus was only present in 33% of the cases.
>
> Probably less than 25% of the cases diagnosed as "pneumonia" in the average general practice are due to an initial infection with pneumococcus, and in any case secondary infections are present sooner or later in all cases of pneumonia.
>
> The ætiological factor in pneumonia, typical and atypical, is definitely a mixed infection.

In view of the considerable amount of work that is being done with the object of producing for curative purposes antisera corresponding to the various types of pneumococci, it appears to me of considerable importance to determine whether the pneumococcus does, or does not, play the chief rôle in the bacteriology of lobar pneumonia. If, as Major Johnson says, "the ætiological factor in pneumonia is definitely a mixed infection," then we cannot expect to derive much benefit from sera protecting against one only of the several causative organisms.

With this in view I wish to record the results of an investigation into a series of pneumoia cases admitted into the Broken Hill Hospital during August and September, 1918.

Lung puncture was done in every case and the media used were human blood-agar and glucose-ascitic-fluid broth. About 2 c.cm. of sterile broth were injected slowly into the lung, and immediately withdrawn and half of it injected on to a blood agar slant and the other half into a broth bottle.

Cultures were observed every day for four days.

Results.

Number of cases	28
No growth obtained	5 cases
Pure culture Gram-negative bacillus	1 case
Pure culture pneumococcus	22 cases

The slender Gram-negative bacillus was probably *B. influenzæ*.

Thus in 78% of this series, pneumococcus was the only organism obtained. In several cases, when 1 c.cm. of blood from a vein was squirted into a blood agar slant, pneumococcus was readily obtained, and in all such cases showing any growth, no organisms except pneumococcus were present.

When one considers that the organisms mentioned by Major Johnson as playing a very important part in pneumonia, such as staphylococcus, *B. friendländer*, *M. catarrhalis*, etc., grow readily on the above media, it will be apparent that this series of cases lends no support to the view that "the ætiological factor in pneumonia is definitely a mixed infection."

It would be of interest to know whether the experience of others is similar to my own.

Yours, etc.,

GLEN. H. BURNELL.

Broken Hill and District Hospital,
New South Wales,
April 15, 1919.

[1] This article was published in the first place in the *South African Medical Record*, of November 23, 1918.

NORMAL SERUM TREATMENT OF ERYSIPELAS.

Sir,—I have had occasion to treat erysipelas on two occasions during the last few months. I injected about 30 c.cm. of normal horse serum. The result was the temperature fell about 3° in about five hours on each occasion and the patient was comparatively well within 24 hours. I have used the same treatment in a few cases of pneumonic influenza. In each case, although there were well-defined pneumonic patches, the temperature and pulse dropped to nearly normal within 24 hours. However, the cases have been so few that they might easily be merely *post hoc*. However, in the case of the erysipelas patient, I am quite convinced it was *propter hoc*. Anyhow, the treatment seems to me to be quite logical and worth a further trial.

Yours, etc.,

L. B. LANCASTER.

Belgrave Street, Kempsey,
New South Wales.

We regret to announce the death of Dr. Eric McLeod Smith, of Bundaberg, Queensland, and of Dr. Alexander Bruce Bennie, of Armadale, Victoria.

Proceedings of the Australian Medical Boards.

VICTORIA.

The following have been registered, under the provisions of Part I. of the *Medical Act, 1915*, as duly qualified medical practitioners:—

Norman Eric Stewart Birnie, M.B. *et* Ch.B., Melb., 1919, Toorak Road, Malvern.

George Frederick Cherry, M.B. *et* Ch.B., Melb., 1919, Gisborne.

John Joseph Daly, M.B. *et* Ch.B., Melb., 1919, 28 Clive Road, Auburn.

Ellen Curtis Edgerton, M.B. *et* Ch.B., Melb., 1919, "The Priory," Gleneira Road, Elsternwick.

Adrian Ward Farmer, M.B. *et* Ch.B., Melb., 1919, 98 Collins Street, Melbourne.

Roy Hanford Hardy, M.B. *et* Ch.B., Melb., 1919, 52 Brunswick Street, Fitzroy.

William Edward Joseph Harrison, M.B. *et* Ch.B., Melb., 1919, 1 Erskine Street, Malvern.

Reginald Herbert Morgan, M.B. *et* Ch.B., Melb., 1919, 28 Gladstone Street, Moonee Ponds.

Hartley Rowland Walker, M.B. *et* Ch.B., Melb., 1919., "Athelstone," Cramer Street, Preston.

Reginald Patrick MacGillicuddy, M.B. *et* Ch.B., Melb., 1917, 11 Hoddle Street, North Richmond.

QUEENSLAND.

The undermentioned has been registered, under the provisions of *The Medical Act of 1867*, as a duly qualified medical practitioner:—

Archibald Warden Graves Murray, Esq., M.B., Ch.M. (Univ. Sydney, 1915), Cairns.

Medical Appointments.

In pursuance of the provisions of *The Health Acts, 1900 to 1917*, Dr. Julius E. Streeter (B.M.A.) has been appointed a temporary Health Officer, Department of Public Health, Queensland.

Dr. H. P. Elliot (B.M.A.) having resigned, Dr. H. W. Lording (B.M.A.) has been appointed Medical Officer at Port Douglas and a Health Officer for the purposes of *The Health Acts, 1900 to 1917*, of Queensland.

Dr. C. J. Rutledge has been appointed Officer of Health for Iron Knob, Hummock Hill and district, South Australia.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xix.

Department of the Navy: Surgeons.

Department of Public Health, Queensland: Medical Officer for Venereal Clinics.

Bundaberg General Hospital, Queensland: Medical Officer.

University of Otago, Dunedin, New Zealand: (*a*) Professor of Systematic Medicine, (*b*) Professor of Clinical Medicine and Therapeutics, (*c*) Lecturer on Clinical Medicine.

Renwick Hospital for Infants, Sydney: Resident Medical Officer.

Medical Appointments.

IMPORTANT NOTICE.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429 Strand, London, W.C.

Branch.	APPOINTMENTS.
VICTORIA. (Hon. Sec., Medical Society Hall, East Melbourne.)	All Friendly Society Lodges, Institutes, Medical Dispensaries and other Contract Practice. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
QUEENSLAND. (Hon. Sec., B.M.A. Building, Adelaide Street, Brisbane.)	Australian Natives' Association. Brisbane United Friendly Society Institute. Cloncurry Hospital.
TASMANIA. (Hon. Sec., Macquarie Street, Hobart.)	Medical Officers in all State-aided Hospitals in Tasmania.
SOUTH AUSTRALIA. (Hon. Sec., 3 North Terrace, Adelaide.	Contract Practice Appointments at Renmark. Contract Practice Appointments in South Australia.
WESTERN AUSTRALIA. (Hon. Sec. 6 Bank of New South Wales Chambers, St. George's Terrace, Perth.)	All Contract Practice Appointments in Western Australia.
NEW SOUTH WALES. (Hon. Sec., 30-34 Elizabeth Street, Sydney.)	Australian Natives' Association. Balmain United Friendly Societies' Dispensary. Canterbury United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Friendly Society Lodges at Lithgow. Friendly Society Lodges at Parramatta, Auburn and Lidcombe. Leichhardt and Petersham Dispensary. Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. Newcastle Collieries—Killingworth, Seaham Nos. 1 and 2, West Wallsend. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
NEW ZEALAND: WELLINGTON DIVISION. (Hon. Sec., Wellington.)	Friendly Society Lodges, Wellington, New Zealand.

Diary for the Month.

May 6.—Tas. Branch, B.M.A., Council.
May 7.—Vic. Branch, B.M.A.
May 9.—S. Aust. Branch, B.M.A., Council.
May 9.—Q. Branch, B.M.A., Council.
May 13.—N.S.W. Branch, B.M.A., Ethics Committee.
May 15.—Vic. Branch, B.M.A., Council; Election of Representative on Representative Body.
May 20.—Tas. Branch, B.M.A., Council.
May 20.—N.S.W. Branch, B.M.A., Executive and Finance Committee.
May 20.—Illawarra Suburbs Med. Assoc. (N.S.W.).
May 21.—W. Aust. Branch, B.M.A., Council and Branch.
May 23.—Q. Branch, B.M.A., Council and Branch.
May 27.—N.S.W. Branch, B.M.A., Medical Politics Committee; Organization and Science Committee.

EDITORIAL NOTICES.

Manuscripts forwarded to the office of this journal cannot under any circumstances be returned.

Original articles forwarded for publication are understood to be offered to *The Medical Journal of Australia* alone, unless the contrary be stated.

All communications should be addressed to "The Editor," *The Medical Journal of Australia*, B.M.A. Building, 30-34 Elizabeth Street, Sydney.

The Secretary of the Victorian Branch is endeavouring to secure copies of the issues of the *British Medical Journal* of the following dates, to complete a file for one of the members. We shall be grateful to any of our readers who has a spare copy of any of the numbers sought, if he will offer them to the Secretary of the Branch:—

1915: April 3 and 10; July 10, 17, 24, 31; August 7 and 21.
1916: July 8, August 5 and 12, November 18.
1918: Title Page and Index, Volume I. and Volume II..